EDITORIAL STAFF

E. L. SHANER
Editor-in-Chief

E. C. KREUTZBERG
Editor

A. J. HAIN
Managing Editor

E. F. ROSS
Engineering Editor

D. S. CADOT
Art Editor

ASSOCIATE EDITORS

G. H. MANLOVE — J. D. KNOX
W. G. GUDE — G. W. BIRDSALL
W. J. CAMPBELL

New York
I. H. SUCH — B. K. PRICE
L. E. BROWNE

Pittsburgh — *Chicago*
R. L. HARTFORD — J. F. POWELL

Detroit — *Washington*
A. H. ALLEN — L. M. LAMM

London
VINCENT DELPORT

BUSINESS STAFF

G. O. HAYS
Business Manager

C. H. BAILEY
Advertising Service

New York . . E. W. KREUTZBERG, B. C. SNELL
Pittsburgh . . . S. H. JASPER
Chicago . . . L. C. PELOTT, W. F. O'DELL
Cleveland . . . R. C. JAENKE

J. W. ZUBER
Circulation Manager

MAIN OFFICE

Penton Building, Cleveland

BRANCH OFFICES

New York . . . 220 Broadway
Chicago . . Peoples Gas Building
Pittsburgh . 1800 Koppers Building
Detroit . 1010 Stephenson Building
Washington . National Press Building
Cincinnati . . . 282 Sinton Hotel
San Francisco . . 2413 Milvia St.
Berkeley, Calif., Tel. Berk. 7354-W
London . . . . Caxton House
Westminster, S.W. 1
Berlin . Berlin, N.W. 40, Roonstrasse 10

• • •

Published by THE PENTON PUBLISHING CO., Penton Building, Cleveland, Ohio. JOHN A. PENTON, Chairman of Board; E. L. SHANER, President and Treasurer; J. R. DAWLEY and G. O. HAYS, Vice Presidents; F. G. STEINEBACH, Secretary.

Member, Audit Bureau of Circulations; Associated Business Papers Inc., and National Publishers' Association.

Published every Monday. Subscription in the United States, Cuba, Mexico and Canada, one year $4, two years $6; European and foreign countries, one year $10. Single copies (current issues) 25c.

Entered as second class matter at the postoffice at Cleveland, under the Act of March 3, 1879.

Copyright 1938 by the Penton Publishing Co.

STEEL

FOR FORTY-EIGHT YEARS—IRON TRADE REVIEW

Contents

Volume 103—No. 18 **October 31, 1938**

READER COMMENTS 7
AS THE EDITOR VIEWS THE NEWS 11
NEWS
- Steel Financial Summary for Third Quarter, Nine Months 13
- Slower Tempo but No Breakdown in Steelworks Construction 15
- Poland Gains Most from Czech Steel Division 16
- Steelworks Operations for Week 17
- One Hundred Thousand Tons of Steel and Other Metals in Fair 18
- Exports, Imports Up in September 23
- Men of Industry 28
- Obituaries 29
- Cites Progress in Essential Metals 30
- Arbitration Group Extends Scope 30
- Meetings 30
- River Shipments Increase Ratio 31
- More Latitude Urged for Rails 31

WINDOWS OF WASHINGTON 21
MIRRORS OF MOTORDOM 25
EDITORIAL—Twenty-Five Years in Metals Industry 32
THE BUSINESS TREND
- Activity Index Responds to Improved Outlook 33
- Charts and Statistics 33-35

TECHNICAL
- Controlled Grain Size 36
- Precision in Aircraft Engines 38
- Explains Processing of Stainless Steel Wire 45
- Cupaloy Valued for Hardness 47
- Coercive Force Measures Carbon Content of Steel 52
- A.I.M.E. Sessions Deal with Bearing Metals, Steelmaking Practice 53

PROGRESS IN STEELMAKING
- Heat Transfer 40

MATERIALS HANDLING
- Dishwashers 42

JOINING AND WELDING
- Molding Fasteners 46
- Welding Finds Wider Use in Machine Tool Field 48
- Welds Large Coke Drums Made from Carbon-Molybdenum Steel 55

HEAT TREATING
- Bright Annealing Wire 50

NEW METAL PRODUCTS 54
INDUSTRIAL EQUIPMENT 56
HELPFUL LITERATURE 59
MARKET REPORTS AND PRICES 65
- The Market Week 66

BEHIND THE SCENES 78
CONSTRUCTION AND ENTERPRISE 84
INDEX TO ADVERTISERS 90

PRODUCTION · PROCESSING · DISTRIBUTION · USE

GUIDE POSTS TO BETTER DIESEL PERFORMANCE

DIESEL ENGINE PARTS

PART	KEY LETTER
Base	A,B,L,I
Bed Plate - heavy engine	L,N
Bed Plate - light engine	A,B,I
Cams	H,J,Q
Cams - heavy engine	G
Camshafts - heat treated	Q,S
Connecting Rod Shoes, Guides	C
Cooling Water Circulating Pump Body	A,R,T
Cooling Water Circulating Pump Impeller	A,R,T
Crankcase	A,B,C,L,I
Crankshaft	S
Cylinder Blocks, Bodies, Frames - heavy engine	C,D,L
Cylinder Liners, for use with above	B,C,M
Cylinder Blocks, Bodies, Frames - light engine	A,E,K
Cylinder Liners, for use with above	A,E,K,R
Cylinder Blocks, Bodies, Frames - high strength	B,R
Cylinder Heads - heavy engine - high strength	M
Cylinder Heads - medium engine	L,P
Cylinder Heads - light engine	A,E,P
Cylinder Heads - light engine - high strength	N
Cylinder Liners - light and medium engines (sand cast, heat treatment optional)	E,P
Cylinder Liners - centrifugally cast, heat treated	A,E,P,R
Cylinder Liners - For use with aluminum blocks and pistons	T
Flywheel	A,B,I
Frame castings - heavy engine	A,B,P,I
Fuel Oil Pump Body	A,R
Housings - heavy engine - see also Frame castings	A,B,P,I
Lubricating Pump Body	A,R
Manifolds	E,P,F,G
Manifolds - water cooled	E,T
Oil Cooler Body	E,T
Pistons - heavy engine	C,M,P
Pistons - heavy and medium engines - high strength	B,N,P
Pistons - light engine	E,K
Piston Crowns - inserts in aluminum pistons - light engine	T
Piston Rings - heavy engine - single cast	A,L,K
Piston Rings - heavy engine - pot cast	B,D,E
Piston Rings - heat treated	R,S
Piston Rings - medium engine - pot cast	A,K
Piston Rings - light engine - pot cast	K,R
Timing Gears	A,K,R
Turbo-Blower Casing	A,K,R
Valves - Cooled cast on head	E,G,T
Valve Guides	E,T
Valve Seats - for use with aluminum heads	T
Valve Seats - heavy engine	E,L

RECOMMENDED COMPOSITIONS AND TYPICAL MECHANICAL PROPERTIES OF NICKEL CAST IRONS FOR DIESEL ENGINE PARTS

KEY LETTER	CHEMICAL COMPOSITION						TYPICAL RANGE OF MECHANICAL PROPERTIES	
	TOTAL CARBON	SILICON	MANGANESE	NICKEL	CHROMIUM	MOLYBDENUM	TENSILE STRENGTH, p.s.i.	BRINELL HARDNESS
A	3.10/3.30	1.40/1.80	0.50/0.80	1.25/1.75	-	-	35,000/40,000	200/240 (7)
B	2.75/3.00	1.30/1.70	0.60/0.90	1.50/2.00	-	-	50,000/60,000	220/260
C	3.00/3.20	1.00/1.40	0.50/0.80	1.00/1.50	-	-	36,000/40,000	200/260
D	3.00/3.20	0.90/1.30	0.50/0.80	1.75/2.25	-	-	38,000/44,000	200/260
E	3.10/3.30	1.70/2.10	0.50/0.80	1.50/2.00	0.40/0.60	-	36,000/40,000	210/250 (7)
P	3.20/3.40	1.90/2.30	0.50/0.80	1.00/1.50	0.40/0.60	-	33,000/38,000	200/240
G	3.10/3.50	1.50/1.80	0.50/0.80	1.75/2.25	0.60/0.75	-	36,000/42,000	220/280
H	3.00/3.20	1.00/1.40	0.60/0.90	2.75/3.25	0.40/0.60	-	45,000/55,000	260/320 (7)
J	3.00/3.20	0.70/0.90	0.60/0.90	1.75/2.25	0.90/1.10	-	35,000/40,000	280/350 (6)
K	3.00/3.30	1.70/2.20	0.50/0.80	0.75/1.25	0.15/0.30	-	33,000/38,000	170/220
L	3.05/3.30	1.00/1.40	0.50/0.80	1.00/1.75	0.30/0.60	(5)	36,000/42,000	220/260
M	2.90/3.10	1.00/1.90	0.60/0.90	1.00/1.50	0.25/0.35	(5)	40,000/50,000	210/260
N	2.70/3.00	1.50/1.90	0.60/0.90	1.75/2.25	0.20/0.40	(5)	50,000/60,000	220/260
P	3.00/3.25	1.30/1.75	0.60/0.90	1.35/1.50	0.30/0.50	0.30/0.60	40,000/50,000	200/260 (7)
Q (3)	3.10/3.40	2.10/2.40	0.50/0.75	0.20/0.40	0.75/1.00	0.40/0.60	50,000/55,000	260/300 (7)
R	3.10/3.30	2.00/2.40	0.50/0.80	1.25/1.75	0.10/0.30	0.30/0.50	45,000/55,000	220/280
S	2.60/3.10	1.90/2.50	0.65/1.00	1.25/1.75	-	0.60/1.00	60,000/70,000	260/300 (7)
T	2.30/3.00	1.00/2.00	1.00/1.50	13.00/16.00 (4)	2.00/5.00	-	22,000/30,000	140/180
I	3.00/3.50	1.00/2.20	0.50/0.80	-	-	-	20,000/30,000	140/180

FOOT-NOTES: (3) Made by Campbell, Wyant and Cannon Foundry Co. (4) Also includes 5.00/7.00% copper. (5) Optional. (6) The chilled surface hardness will be approximately 550 Brinell. (7) Heat treatment optional.

WITH economical Diesel power being applied to many new uses, this summary of Diesel engine materials in actual service can be helpful as a guide and comparison for your specifications. These Nickel cast irons have a background of successful performance under many conditions.

Because Diesel engines vary widely in size and type, more than one Nickel cast iron composition is suggested and your choice will depend upon the size and service requirements of your engine.

Since earliest days of Diesel development, it has been Nickel's privilege to aid in the development of stronger, longer-wearing materials which withstand higher pressures and higher temperatures. Consultation regarding the uses of Nickel is invited.

THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL STREET, NEW YORK, N. Y.

As the Editor Views the News

■ IT COST fourteen leading steel producers representing 83.7 per cent of the country's ingot capacity (p. 13) $7,282,424 to run their business during the third quarter in accordance with the administration's wishes—that lower prices are desirable but that high wage rates should not be reduced. This compared with a loss of $8,140,206 by these same companies during the second quarter. The third quarter showing actually was much better than had generally been anticipated. Chief reason was a 40.6 per cent operation during third quarter as compared with 30.7 in the second. Also, the steel industry continues to make progress in eliminating inefficient and wasteful practices. A leading company reports its "break-even" operating rate now is 45 to 50 per cent.

• • •

Business in Steady Rise

Total net profits of 33 prominent metalworking companies in the first nine months of this year (p. 14) were $9,506,008 or 14.9 per cent of net profits for the same companies in the corresponding months of 1937. . . . Business continues to improve. Steel production last week (p. 17) rose three points, to 54½ per cent of ingot capacity. STEEL'S index of industrial activity (p. 33) is at 88.8 per cent, new high for the year. Bellwether in activity, the automobile industry again last week (p. 25) stepped up production; this industry definitely promises uninterrupted production at a high rate over the next two months. Leading utility companies, as a part of the national defense program, are to place large orders without delay (p. 21) for electric generating equipment.

• • •

Reciprocal Tariffs Help

A study of foreign trade since reciprocal tariffs have been operative (p. 21) reveals imports have increased by 93 per cent while our exports have increased less than 60 per cent . . . The steel industry is spending $160,000,000 on plant improvements this year as compared (p. 15) with $320,000,000 in 1937 . . . Department of mines reports much progress in development of new methods (p. 30) of recovering manganese, chromium, nickel, antimony, magnesium and boron from lean domestic ores . . . River shipments of steel from the Pittsburgh district (p. 31) are increasing sharply . . . Railroads and public would best be served, says one authority, by permitting them (p. 31) to own and operate boat lines and motor truck lines.

• • •

Aids Small Consumers

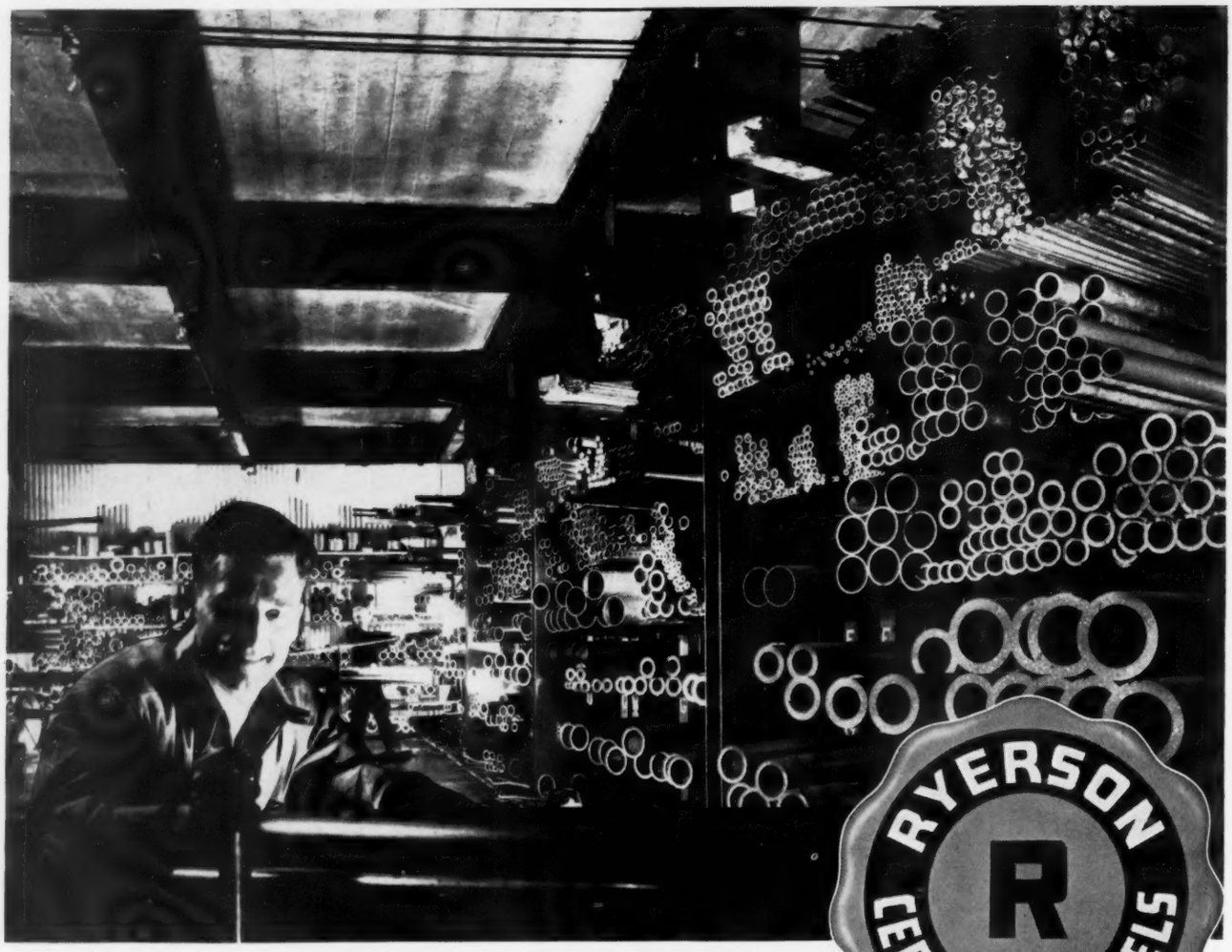
Complete assortments of all types and sizes of controlled grain size steel now are carried in warehouse stocks, thus solving the inventory problem of small consumers who (p. 36) must be in a position to guarantee physical characteristics after heat treatment. . . . Curves representing 377 heats indicate that some operators of electric arc melting furnaces can derive advantages from changes in practice. These show (p. 40) that a limited rate of heat input results in economies. . . . A rather unusual materials handling system is the heart of manufacturing operations at a dishwasher plant. It consists (p. 42) of a double line of roller conveyors with turntables and crossovers. . . . A robot bartender, consisting mostly of zinc alloy die castings (p. 54), mixes drinks mechanically.

• • •

Finer Steel, Better Gas

Higher efficiency gasolines depend on the equipment that can be made available. Four drums just completed for this use (p. 55) are 12½ feet in diameter and 52½ feet long. They will operate at 435 pounds per square inch and 870 degrees Fahr. To resist creep they were made of carbon-molybdenum steel. . . . A new copper-chromium-silver alloy (p. 47) has high electrical conductivity, withstands high temperatures and has high strength. . . . A manufacturer of fine brass, bronze, nickel, silver, monel and other nonferrous metal wires has developed (p. 50) a new gas-fired, continuous, strand furnace, 18 feet long, which permits controlled, uniform grain structure. . . . Available for open-hearth furnace use (p. 52) is a new method for quick determination of carbon in samples taken from the molten metal.

E. L. Shaner



Timken Quality Tubing---
Immediate Ryerson Shipment

Timken Tubing is not an ordinary steel mill product, but a specialty manufactured to meet exacting requirements. As large users of tubing for the cones and cups of bearings, Timken definitely realizes the value of uniform chemical and physical characteristics, and carefully controls these factors to develop a dense close structure that assures good machinability.

Timken Quality is safeguarded through every step of manufacture. Complete, modern mill equipment is skillfully manned by operators of long experience, and an unusually strong staff of metallurgists is equipped with the most complete laboratory facilities. Each heat of steel is subjected to frequent tests from furnace to finished product, thus insuring uniform high quality whether you order a single tube or a carload.

Ten strategically located Ryerson plants offer you Immediate Shipment of Timken Tubing. Rigid inspection systems, special storing methods, experienced crews, and unsurpassed transportation facilities assure prompt, intelligent service. Draw on the Ryerson plant nearest you.

Joseph T. Ryerson & Son, Inc. Plants at: Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Philadelphia, Jersey City.

RYERSON CERTIFIED STEELS ALSO INCLUDE:

Alloy Steels—Tool Steels
Stainless Steel
Heat Treated Alloy Steel Bars
Cold Finished Bars, Shafting and Screw Stock
Beams and Heavy Structurals
Channels, Angles, Tees and Zees
Hot Rolled Bars—Hoops
Plates—Sheets
Strip Steel, Flat Wire, etc.
Boiler Tubes and Fittings
Welding Rod—Mechanical Tubing
Rivets, Bolts, Nuts, Washers, etc.
Reinforcing Bars
Babbitt Metal and Solder

RYERSON STEEL-SERVICE

Steel Reduces Quarterly Loss; Nine Months' Deficit $23,000,000

■ FOURTEEN leading steel producers, representing 83.7 per cent of the country's total ingot capacity, report an aggregate net loss of $7,282,424 for the third quarter, compared with $8,140,206 net loss for the identical companies in the second quarter.

Steel ingot output in the third quarter was 33.9 per cent higher than in the second period, and the failure of earnings to keep pace with this higher rate of operations is attributed to the lower prices.

Nine months' net loss for the 14 producers totaled $19,263,099, contrasting with $186,718,410 net profit in the corresponding period in 1937.

Assuming the experience of these 14 to be typical, indicated net loss for the industry was approximately $23,000,000, against $236,000,000 net profit in the first three quarters, 1937.

Ingot production in the third quarter was at a rate of 40.6 per cent of capacity; 30.7 per cent in the second, and 31.6 in the first, averaging 34.4 for the nine months. In the first nine months last year the rate was 83.1 per cent.

Indicated average loss per ton of ingot capacity for the 14 producers in the nine months this year was 44 cents. In the period last year they averaged a net profit of $4.60 per ton of ingot capacity.

Estimated individual profit per ton, based on each company's ingot capacity for the nine months, was down sharply; in most instances there was a loss.

Comparisons:

	1938	1937
Continental Steel Corp.	$1.92	$3.78
Inland Steel Co.	1.79	7.19
National Steel Corp.	1.53	8.36
Bethlehem Steel Corp.	0.21	3.87
Youngstown Sheet & Tube Co.	0.32*	4.48
Wheeling Steel Corp.	0.42*	3.81
U. S. Steel Corp.	0.63*	4.93
Sharon Steel Corp.	0.97*	4.88
Republic Steel Corp.	1.72*	1.87
Jones & Laughlin Steel Corp.	1.78*	2.25
Otis Steel Co.	2.07*	4.33
Rustless Iron & Steel Corp.†	2.89*	21.47
Wickwire-Spencer Steel Co.	5.22*	9.58
For all	0.44*	4.60

*Loss. †Stainless steel ingots.

BETHLEHEM'S "BREAK-EVEN" 45 TO 50 PER CENT OF CAPACITY

Bethlehem Steel Co. earned $446,866 in the third quarter, compared with $150,305 in the June period, and $9,249,560 in the third period, 1937.

Directors declared regular preferred quarterly dividends of $1.75 on the 7 per cent cumulative preferred, and 25 cents on the 5 per cent cumulative preferred, payable Jan. 3 to stockholders of record Dec. 2.

Company's steel production, ingots and castings, averaged 46.4 per cent of capacity during the third quarter, compared with 35.7 per cent in the second quarter and 85.1 per cent in the third quarter last year. Current steelworks operations approximate 56 per cent of capacity.

Estimated value of orders on hand Sept. 30 was $101,528,356, compared with $89,916,012 on June 30, and $125,820,124 on Sept. 30, 1937. Finished steel shipments in third quarter were 790,000 tons, compared with 639,000 in second quarter.

President E. G. Grace said incoming business is sufficient to maintain the current operating rate, saw hope for bettering the rate before Jan. 1.

At present prices and costs, Mr.

Steel Producers' Financial Statements Summarized

	Third quarter 1938	Second quarter 1938	Third quarter 1937	Nine months 1938	Nine months 1937	Ingot capacity, gross tons
U. S. Steel Corp.	$5,847,791*	$5,010,426*	$30,617,638	$12,150,368*	$90,852,853	25,790,000
Bethlehem Steel Corp.	446,866	150,305	9,249,560	1,592,079	27,566,267	10,042,000
Republic Steel Corp.	2,387,556*	2,856,317*	3,237,155	8,306,438*	9,291,470	6,453,000
Jones & Laughlin Steel Corp.	1,958,810*	1,654,303*	1,750,696	4,882,838*	6,185,066	3,660,000
National Steel Corp.	1,813,997	1,005,863	5,227,071	3,908,495	16,935,967	3,400,000
Youngstown Sheet & Tube Co.	726,546*	118,033	3,586,495	749,042*	10,494,627	3,120,000
Inland Steel Co.	1,098,245	1,135,097	4,433,375	3,156,412	12,620,532	2,340,000
Wheeling Steel Corp.	606,908	624,888*	1,230,192	549,015*	5,002,033	1,750,000
Otis Steel Co.	465,596*	520,101*	948,285	1,283,076*	2,691,105	828,000
Sharon Steel Corp.	19,065*	192,006*	498,570	362,980*	1,646,606	500,000
Continental Steel Corp.	192,360	156,091	258,890	403,660	793,512	280,000
Keystone Steel & Wire Co.§	83,224	304,054	203,694	574,847	985,745	205,000
Wickwire-Spencer Steel Co.	137,643*	117,922*	230,365	587,481*	1,077,786	150,000
Rustless Iron & Steel Corp.	18,983	33,686*	199,920	77,354*	574,841	†35,700
Totals	$7,282,424*	$8,140,206*	$61,671,906	$19,263,099*	$186,718,410	58,553,700
FINISHING CAPACITY ONLY						
Acme Steel Co.	$ 110,007	$ 62,170	$ 305,863	$ 173,146	$ 2,070,245	.....
Superior Steel Corp.	49,994*	121,290*	103,492	312,453*	310,260	.....
PIG IRON CAPACITY ONLY						
Interlake Iron Corp.	$ 452,018*	$ 294,587*	$ 837,371	$ 718,339*	$ 1,782,408	1,215,000
Virginia Iron, Coal & Coke Co.	44,771*	66,885*	30,335*	139,721*	93,168*	200,000

*Loss. †Stainless steel ingots. §Fiscal year ends June 30.

Grace estimated Bethlehem's "break-even" point lies between 45 and 50 per cent of capacity operations. Much depends, he said, on the character of tonnage going through the mills at various seasons.

Although operations were up 10 points or about 30 per cent, Bethlehem's net income increased only about $300,000 over the second quarter, indicating the increase in operations just about compensated for the lower prices.

Mr. Grace attributed the recent break in sheet and strip prices to "competition." He absolved automobile builders from all blame and denied they exerted pressure for the concessions. Third quarter prices were $3.92 per ton less than in the second period.

Most active buyers at present, he said, are the automakers. Railroads probably will buy a fair tonnage before the year closes, although demand from this source is expected to be relatively light.

Tin plate has lagged principally for two reasons—a smaller vegetable pack and a substantial carryover of lower-priced tonnage from last year. Ship tonnage is being helpful, but not too important in the broad picture, he added.

Bethlehem employes received an average hourly rate of 89.3 cents in the third quarter, the highest in the company's history. Quarter's payroll totaled approximately $30,000,000. Approximately 85,000 were on the payroll, compared to 105,000 a year ago. Third quarter work week averaged 28.8 hours, against 26.6 in the second period, 27 in the first, and 36.5 for all 1937.

The corporation spent about $5,000,000 for expansion during first nine months, has earmarked $3,500,000 for further miscellaneous improvements, to be made as quickly as possible. This, he said, is about normal.

SHIPMENTS HIGHER, BUT U. S. STEEL'S LOSS IS GREATER

A deficit of $12,150,368 was incurred by United States Steel Corp. for the first nine months this year, in contrast with a profit of $95,852,853 in the period last year. Its third quarter loss—$5,847,791—was higher than that in the second quarter—$5,010,426. Directors declared the regular quarterly dividend of $1.75 on preferred stock, payable Nov. 19.

Its shipments were larger in the third quarter than in the second, but the improvement was insufficient "where under existing market conditions and high costs of operations a profit was possible."

Measured by finished steel shipments operations were as follows:

Quarters, 1938	Tons shipped	Per cent of capacity
First	1,565,244	35.3
Second	1,445,110	32.0
Third	1,577,870	34.6
Nine months	4,588,224	33.9
Like period, 1937	10,956,846	81.4
Decrease, 1938	6,368,622	47.5

Operations during the first weeks in October averaged better than 43 per cent of capacity.

Net income available for capital stocks for each quarter of 1938, was as follows:

Quarters, 1938	Net for capital stocks
First	$ 1,292,151—Deficit
Second	5,010,426—Deficit
Third	5,847,791—Deficit
Nine months	$ 12,150,368—Deficit
Same mo's., 1937	$ 90,852,853—Income
Decrease, 1938	$103,003,221—Deficit

Total net working assets before deducting last weeks dividend declaration, but inclusive of the proceeds from the sale in June of the $100,000,000 issue of debenture bonds and after payment of bank loans totaling $50,000,000, were, at Sept. 30, 1938, $433,981,870.

This compares with: $372,388,530, Dec. 31, 1937; and $391,330,566, Dec. 31, 1936.

Capital outlays now being made are limited largely to those necessary in completing the program of plant improvement now rapidly nearing completion. Expenditures this year to Sept. 30 for property outlays and retirement of capital obligations totaled $64,500,000. At Oct. 1, unexpended balances against approved appropriations for property additions and betterments amount approximately to $24,000,000.

Employment statistics:

	Nine months ended Sept. 30		Per cent decrease
	1938	1937	
Number of employes	201,533	263,542	23.5
Total payroll	$202,488,466	$354,217,827	42.8

NATIONAL STEEL

Leading all other steel producers in earnings for third quarter, National Steel Corp., Pittsburgh, reports a net profit of $1,813,997, equal to 84 cents per share on 2,168,117 shares of capital stock. This compares with net profit of $1,005,863, equal to 46 cents per share, in the preceding quarter. Net profit for the nine months ended Sept. 30

(*Please turn to Page* 81)

Consumers' Net Profit 14.9% of 1937

■ TOTAL net profit for 33 companies among equipment manufacturers, suppliers, and other leading iron and steel consumers in the first nine months totaled $9,506,008, or only 14.9 per cent of the $63,920,635 net profit reported by the identical companies in the comparable period last year. Twelve of the 33 companies reported a loss during the third quarter, whereas only two had a loss in the same period a year ago. In the following, all figures are net earnings, except where asterisk denotes loss.

	Third Quarter		Nine Months	
	1938	1937	1938	1937
Mullins Mfg. Corp., New York	$ 141,511*	$ 159,157	$ 459,466*	$ 516,665
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.	1,712,220	5,394,728	6,212,822	16,726,520
Bendix Aviation Corp., Chicago	89,794	279,207	406,205*	1,911,168
Truscon Steel Co., Youngstown, O.	280,993*	231,905	880,268*	456,863
Edward G. Budd Mfg. Co., Philadelphia	546,825*	107,465	1,577,027*	1,198,329
Budd Wheel Co., Philadelphia	223,021*	75,055	588,245*	596,015
Allis-Chalmers Mfg. Co., Milwaukee	505,160	2,644,588	3,384,219	6,786,336
Transue & Williams Steel Forging Corp., Alliance, O.	48,535*	3,341*	178,671*	95,094
Thompson Products Inc., Cleveland	165,454	135,577	277,552	879,581
Bridgeport Machine Co., Wichita, Kans.	21,606	205,790	15,076	586,492
Harbison-Walker Refractories Co., Pittsburgh	154,700	782,100	384,300	2,795,300
Pittsburgh Coke & Iron Co., Pittsburgh	36,389	277,968	176,256	801,335
Clark Equipment Co., Buchanan, Mich.	35,867	251,368	187,125	1,039,807
Marion Steam Shovel Co., Marion, O.	159,770*	236,466	440,338*	297,251
Glenn L. Martin Co., Baltimore	768,393	492,532	2,140,994	1,018,839
McKay Machine Co., Youngstown, O.	19,106	41,733	90,740	111,099
Motor Products Corp., Detroit	334,061*	318,006	250,839*	1,772,878
American Brake Shoe & Foundry Co., New York	272,921	829,649	758,135	2,752,320
Eaton Mfg. Co., Cleveland	238,830*	432,322	589,164*	2,141,952
National Malleable & Steel Casting Co., Cleveland	347,256*	435,117	1,208,574*	2,329,789
Federal-Mogul Corp., Detroit	64,915	53,918	177,145	310,772
A. M. Castle & Co., Chicago	31,573	242,547	156,706	887,234
New York Air Brake Co., New York	51,286*	92,257	271,558*	1,007,051
Bliss & Laughlin Inc., Harvey, Ill.	14,551	152,153	22,414*	643,203
Square D Co., Detroit	92,194	252,466	208,522	788,616
Central Foundry Co., New York	91,338*	13,782*	270,405*	9,402
Midland Steel Products Co., Cleveland	37,263	351,249	371,960	1,564,040
Minneapolis-Honeywell Regulator Co., Minneapolis	576,734	778,956	719,641	2,220,040
Westinghouse Air Brake Co., Wilmerding, Pa.	11,555	1,846,833	508,836*	5,837,334
Yale & Towne Mfg. Co., Philadelphia	175,522*	214,539	323,050*	949,115
Ex-Cell-O Corp., Detroit	143,443	196,157	301,693	480,205
Simonds Saw & Steel Co., Fitchburg, Mass.	135,798	278,748	218,566	1,565,410
National Cash Register Co., Dayton, O.	224,527	827,858	1,699,616	2,831,580

Slower Tempo, but No "Breakdown" in Steelworks Construction Programs

■ STEELWORKS construction is proceeding at a pace approximately 50 per cent slower than a year ago, a survey by STEEL's editors reveals. Total expenditures for this work in 1938 is estimated at $160,000,000, compared with $320,000,000 in 1937.

Most projects recently completed or now being carried on are parts of programs projected before business dropped sharply a year ago. Few, if any, such projects have been canceled or postponed; but few new major projects have been added since the recession.

Most companies have completed or are completing expansion and rehabilitation programs started in the post-depression recovery and now have physical properties in satisfactory condition. Spokesman for one large steel company said, significantly: "When we make money, we will spend money."

While there is no evidence of cancellation or postponement of iron and steelworks construction, completion of some of these projects has taken a longer time than originally contemplated. In numerous instances, steel companies specified their own idle workers be given preference in construction jobs.

Retarding factors, in addition to lack of demand and profits, have been fear of labor difficulties, still more burdensome taxes and government regimentation. Capital throughout the early part of 1938 was decidedly wary.

Recently this situation has improved and now capital undoubtedly is freer than it was a year ago this time, especially for financing of programs by large corporations. September capital issues were down from August, due in a measure to the war scare, and for the first nine months were below those for the corresponding 1937 period. Gradual improvement has been noted during the late summer and fall, however, and today there is a fairly receptive market for new issues.

For the smaller companies which usually have to finance expansion from surplus, or at least have a good backlog of orders to negotiate bank loans, financing still is difficult.

Not only is the resultant hesitancy reflected in the steel and metalworking industries, but also among consumers. Public utilities continue to do no more construction than is absolutely necessary. Some important oil company expansion is being held up and the difficulties of the railroads are well known.

Anticipating a good year ahead, automobile plants and metalworking companies supplying them have been putting the finishing touches on expansion and rehabilitation programs.

Great Lakes Steel Corp. within the past few weeks has lighted its new blast furnace, coke ovens, and four new open-hearth furnaces.

Ford Motor Co. expansion is nearing completion and the new tool and die shop, together with new body plant, soon will be in operation. A new blast furnace project has not been revived, although extensive improvements have been made to steelmaking facilities.

The new melt shop for Rotary Electric Steel Co., Detroit, gradually is taking shape, with about 10 per cent of the actual construction having been completed.

New plants for Dodge truck and Briggs Mfg. Co. have been completed and are in operation. In partial operation is the new plant of Firestone Steel Products Co.

Two Projects in Detroit

In the past week or two, building programs have been projected by two steel companies in the Detroit district. Allegheny-Ludlum Steel Corp. will erect a new warehouse. This will cover an area 85 x 220 feet, and will replace the present Ludlum warehouse on East Grand boulevard. The Modell-Friedman division of Reliance Steel Corp., also is building a new warehouse, at the intersection of Joy and Schaefer roads, Detroit, to replace present facilities at 1205 Beaufait street.

Contracts have been let on schedule for the new service and parts building for Buick at Flint, Mich., requiring an expenditure estimated at $1,000,000.

Youngstown Sheet & Tube Co. has let contracts for hot and cold strip mills for its $16,500,000 Indiana Harbor, Ind., improvement. Other contracts for this project are expected to be awarded soon.

United States Steel Corp. is completing the widespread program inaugurated last year. Largest component is Carnegie-Illinois Steel

(*Please turn to Page* 81)

Runner for Giant Turbine

■ **Massive vanes of rotating element for one of two 26,000-horsepower hydraulic turbines just installed by Appalachian Electric Co. on New river, near Miles, Va. Each turbine complete with runner, guide case and plate steel spiral casing, weighs 500,000 pounds. The runner is shown before final machining in Allis-Chalmers Mfg. Co's., plant, Milwaukee**

Poland Gains Most from Czech Steel Division; Germany Broadens Trade

By VINCENT DELPORT
European Manager, STEEL

LONDON

■ WHEN, on Friday, Sept. 30, it became known that war had been avoided, industry and commerce — long in suspense — began to move more smoothly again.

However, it is apparent there will be no interruption in the race for armaments, for Europe has learned by this experience that treaties, no less than verbal agreements, cannot be taken for granted unless force is available to meet force.

It will probably be a long time before anything like normal conditions can be re-established in commercial and industrial activities, because war manufactures, spread over a wide variety of plants, will have priority.

Conclusion of the Munich agreement, following upon the Berchtesgaden and Godesberg talks, has brought about far-reaching changes in the industrial layout of Central Europe, and it is with this aspect that this article is concerned.

The facts are that Czechoslovakia has lost to Germany about 12,000 square miles of territory and, in addition, has handed over to Poland a relatively small but rich area known as the Teschen district, while more territory is being ceded to Hungary.

Czechoslovakia is divided into four main regions: Bohemia, Moravia, Slovakia and Ruthenia, with part of Silesia bordering on Germany and Poland, north of Moravia, which is rich in coal mines and is the main center of iron and steel production. Bohemia, particularly the western part, bordering on Germany, is important industrially, the main manufactories being engineering works, chemical works, porcelain works, glass works, breweries. Slovakia and Ruthenia are mainly agricultural districts, and large tracts of land are also covered by forests.

The chief mineral wealth of Czechoslovakia is coal. The entire country produced 16,900,000 metric tons of hard coal and 18,000,000 tons of soft coal in 1937.

Iron ore is available in Slovakia and in Bohemia, the annual output, between 1927 and 1937, ranging from 1,000,000 to 2,000,000 tons.

Steel Centered in Silesia

Iron and steel production is largely concentrated in the Silesian district, the next important center being at Kladno, near Prague. In 1937, the production of raw steel for the whole country was 2,300,000 metric tons, and pig iron 1,675,000 tons. In addition, a number of foundries and engineering works are situated in the iron and steel producing centers and in the vicinity of the larger towns.

The first striking fact, when considering the industrial losses of Czechoslovakia, is that as far as coal, iron and steel are concerned, practically all the fields yielding hard coal, and considerable iron and steel capacity in Silesia have been taken by Poland.

Germany was the mainspring in starting the partition of Czechoslovakia and was prepared to go to war for the purpose, but Poland has captured the richest prize, from the point of view of coal, and important iron and steel resources. Before the war of 1914-18 the properties now taken over by Poland were in Austrian territory.

By taking possession of the Teschen district, Poland gains the extensive coal field of Ostrava-Karvinna, which yielded roughly three-quarters of the total output in Czechoslovakia, and supplied about 98 per cent of Czech coke.

Poland is thus adding from 12,000,000 to 13,000,000 tons a year to her coal production, and nearly 2,000,000 tons of coke, while what remains of the Czech iron and steel industry will be deprived of national coke supplies.

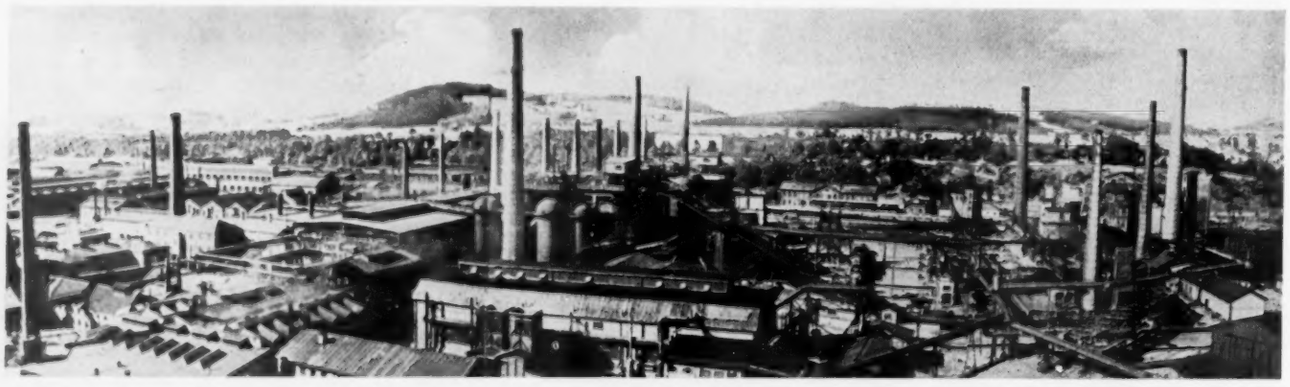
Also in the district taken over by Poland is one of the largest iron and steel works in that part of Europe, the Czechoslovak Mining & Iron Works Co., at Trinec. The Trinec works' capacity is about 500,000 tons each of steel and pig iron annually. This company has used most of the iron and steel it has produced in making various rolled products, tubes, castings and forgings. It is interesting to note that capital control of the concern is in the hands of the Schneider group, of Le Creusot, France.

A little farther west are the important iron and steel works of the Vitkovice Mines, Steel & Ironworks Corp., with works at Moravska-Ostrava and Vitkovice. Both places are located a few miles apart in the apex formed by the boundary lines of Germany, Poland and Czechoslovakia, in the Silesian district.

The fate of the Vitkovice concern still is in the balance, as it is not yet decided whether that part of the territory will remain Czech or be ceded to Germany.

Control of the Vitkovice company was, at least until recently, in the hands of the Viennese branch of the Rothschild family. Capacity of the combined works is 800,000 tons of steel, 750,000 tons of pig iron.

At the time of writing (Oct. 13) therefore, Czechoslovakia has lost to Poland 75 per cent of her output of hard coal, 22 per cent of her raw



■ Czechoslovak Mining & Iron Works Co.'s plants in Trinec, Czechoslovakia, taken by Poland. They are among the largest iron and steel works in Central Europe

steel, 30 per cent pig iron capacity.

If she loses the Vitkovice and Moravska Ostrava works, she will lose a further 35 per cent in steel, and 45 per cent in pig iron capacity.

What is left of the Czech iron and steel industry, apart from the Vitkovice concern, consists mainly of the Skoda works at Plzen, now dangerously near the new German border. The Skoda company also is controlled by the Schneider interests, and produces raw steel, chiefly for castings and forgings, both at Plzen and at Hradek, annual capacity being about 150,000 tons. There is also the Prague Iron & Steelworks Co., with works at Kladno, having a capacity of about 500,000 tons each of pig iron and steel. The Poldi steelworks makes special steel, and the State Iron & Steel Works produces pig iron and steel. A few other concerns also make steel.

Germany's participation in the general regrouping at present comprises little in regard to raw steel production and still less in pig iron. Those she obtained when she annexed Austria.

Germany's gains, however, apart from a line of up-to-date and valuable fortifications, are far from being negligible. They include extensive coal fields in the Bohemian districts, mainly soft coal, of which Germany already has an abundance. The annual output of the mines exceeds 15,000,000 tons, or 83 per cent of the total Czech output.

The annexed territories include a Mannesmann tube works, several plants for manufacturing machinery, and other factories.

Where Germany probably gains the most is in possibilities for extending her trade toward the East. Germany is now in a better position than ever before to control the trade with eastern Europe and the Balkans. The conclusion gradually emerges that this may be the dominating motive that would explain Germany's policy of recent years, for her rulers have lost no time in launching an extensive campaign to establish her commercial domination, starting with neighboring Jugo-Slavia, right across to Turkey.

Such a course is made easier by the fact that Germany now practically controls the Danube—for who will prevent her? Such is the trend of events for the near future, which gives much food for thought to western European nations, not excluding Germany's present associate, Italy.

District Steel Rates

Percentage of Ingot Capacity Engaged in Leading Districts

	Week ended Oct. 29	Change	Same week 1937	Same week 1936
Pittsburgh	42	+ 3	41	69
Chicago	46.5	+ 1.5	44	76
Eastern Pa.	34	+ 2	43	48
Youngstown	61	+ 4	54	76
Wheeling	59	+ 5	62	86
Cleveland	74	+10	59	77
Buffalo	49	None	51	87
Birmingham	57	None	64	61.5
New England	55	—15	25	75
Cincinnati	70	None	70	96
St. Louis	43	— 2.5	51.6	†
Detroit	82	+ 3	90	95
Average	54.5	+ 3	51	73

†Not reported.

Central Europe's Steel and Fuel Map Remade

■ **Principal steelworks in Czechoslovakia (that was) are shown on the map. In the small Silesian area taken over by Poland are the plant of the Czechoslovak Mining & Iron Works, at Trinec, and coal fields near Teschen producing about 75 per cent of Czech coal. In the angle between the areas taken over by Germany and Poland are works of the Vitkovice Mines, Steel & Ironworks Corp., at Moravska Ostrava, the disposition of which has not been determined. At Plzen is the Skoda Works and nearby, at Kladno, the Prague Iron & Steelworks Co., which remain in possession of the Czechs**

PRODUCTION

■ STEELWORKS operations last week gained in seven producing centers, were unchanged in three and declined in two. The national rate is estimated at 54.5 per cent, an increase of 3 points. Indications are for a higher rate this week.

Youngstown, O. — Up 4 points to 61 per cent, with two bessemers, 53 open hearths and 13 blast furnaces active. This week is forecast at 63 per cent as Carnegie-Illinois Steel Corp. and Youngstown Sheet & Tube Co. each will add an open hearth. The latter will blow in another blast furnace late in the week.

Cleveland — Addition of two open hearths each by Republic Steel Corp. and Otis Steel Co. raised the rate 10 points to 74 per cent. Republic will light another open hearth this week and also blow in its fourth blast furnace.

Chicago — A new high for the year was attained last week, with an increase of 1.5 points to 46.5 per cent.

Central eastern seaboard — Advanced 2 points to 34 per cent.

St. Louis — Down 2.5 per cent to 43 per cent as result of several minor adjustments.

Cincinnati — Steady at 70 per cent for third consecutive week.

Buffalo — Unchanged at 49 per cent.

Birmingham, Ala. — For the seventh week steel production held at 57 per cent, with 13 open hearths active. A fourteenth furnace is expected to be lighted about Nov. 1. Tennessee Coal, Iron & Railroad Co. has increased production in its coal mines, only one now being idle.

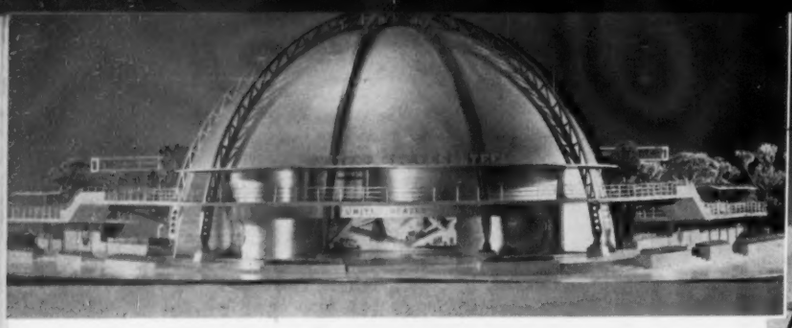
Detroit — Gained 3 points to 82 per cent, one producer operating at 100 per cent and the other increasing slightly by a change in furnaces. Another open hearth probably will be added by Ford Motor Co. this week.

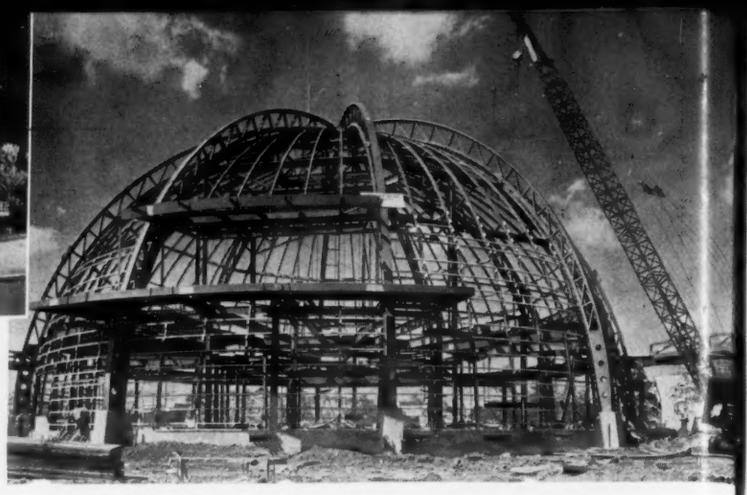
New England — Unexpected removal of two open hearths, one for repairs, brought the rate down 15 points to 55 per cent. One unit will be relighted this week.

Pittsburgh — Increased activity by a large interest caused a rise of 3 points to 42 per cent, with a further gain expected this week.

Wheeling — Advanced 5 points to 59 per cent on additional activity by one interest.

■ Chicago iron and steel industry has been assigned a quota of $160,000 in the 1938 campaign of the Chicago community fund to raise $3,550,000 for support of 173 of the city's major social welfare and charitable agencies.





■ Skeleton of United States Steel Corp.'s "inside out" exhibit building, ready to support a stainless steel dome 65 feet high, 132 feet diameter. Circular trusses will remain exposed to impress the public with the importance of steel. Left: Model of the building

100,000 Tons of Steel and Other Metals in New York World's Fair

■ BY MID-APRIL approximately 500,000 tons of materials will have been transported to the World's fair site, Flushing Meadows, New York, assembled, fabricated and erected for next year's exposition. Rising on a 390-acre site which was marshland a few months ago are thousands of tons of steel.

Following the general theme, "The World of Tomorrow," the steel and allied industries are introducing new building designs. Many are ultra-modernistic, present radical uses of steel and metals. The tonnage of stainless steel building trim is high.

For exhibition buildings 50,000 tons of structural steel has been required, the bulk of which now is erected, or being fabricated. Taking into consideration bridges, traffic links, a branch railroad and station, preparation of the site which includes a new water system, and miscellaneous construction directly due to the exposition, it is estimated close to 100,000 tons of steel and other metals will be absorbed. A total of 10,000 tons of steel and cast iron pipe has been laid.

Exemplifying the steel industry's co-operation in the modernistic theme and architecture is the United States Steel Corp. building. Of polished stainless steel in form of a hemisphere, and supported by ten external trusses curving upward and meeting 72 feet above the ground, this has been referred to as "inside out" construction.

Covered with 28,000 square feet of 28-gage stainless sheets, each 36 x 96 inches, the dome is 65 feet high and 132 feet diameter. The steel framework, 350 tons, is as much a part of the exhibit as the interior, and will be blue with concealed lighting to illuminate the shining dome at night.

Steel will be used in walls, ceilings, decorative effects, railings, furniture and accessories. Dramatic exhibits of steel in hundreds of forms and finishes will fill two floors.

Cables suspended from the trusses will hold the second floor in place. Designed to accommodate 25,000 guests daily, the building will occupy 21,190 square feet of a site containing 55,166 square feet. An elevated terrace extends across the structure's face at the second story level, winging at each side to form a lounging and promenade space for 1000 visitors, with seating arrangements for 500.

"Steel thinks ahead" will be the theme, and 9000 square feet of space will be devoted to exhibits bearing on this subject.

Inspection will be regulated, visitors entering the main entrance moving in one direction past first-floor exhibits and thence up a wide stairway to the second floor where they will emerge to the elevated terrace, with stairways to the ground. An executive lounge projects from the rear on the second floor, overlooking a landscaped garden with benches and 200-foot trellis, 30 feet high, constructed of structural steel shapes. At the base of the six vertical columns will be exhibits of steel products.

The grounds will be enclosed with a 9-foot, chain-link fence, 15,700 feet in length, the material being produced at Waukegan, Ill., for the Cyclone Fence Co., United States Steel subsidiary. The contract, $33,000, is said to be the largest ever placed for chain-link fence.

American Bridge Co., Pittsburgh, erected the theme centers of the fair, the Trylon and Perisphere, taking a total of 3350 tons of structural steel.

Few structures have less duplication of parts or more unusual connections. The work involved an unusual amount of bending and welding. Pipe to support the Helicline,

■ Structural steelwork for the Aviation building. Frames for most of the buildings representing industrial groups, as well as those erected for large manufacturing companies are built substantially of steel

a wood deck on pipe columns, was supplied by the National Tube Co., Pittsburgh, and is from 16 to 30 inches in diameter. The Helicline or ramp is 927 feet long, extends from Trylon three-quarters of the way around the Perisphere before reaching the ground.

Buildings constructed by the fair organization itself require 16,500 tons of steel, fabricated and erected by American Bridge. Exhibitors, concessionaires, and state, federal and foreign governments placed orders for close to 30,000 tons, widely distributed among fabricators. The theme buildings required 7125 pieces of structural material and 250,027 rivets. Work done by American Bridge on the theme centers cost approximately $730,000.

The three acres of surface on the Perisphere will be covered with two layers of gypsum board. The Trylon will be surfaced with the same material except for the upper 125 feet, which is metal plate.

Foreign Buildings of Steel

The foreign zone, a special pavilion sponsored by 25 nations, occupies 100 acres. The Belgian exhibit will include a 155-foot tower with a carillon of 100 bronze chimes cast in Belgium. That nation also fabricated its own steel in Belgium. All foreign buildings are of steel construction.

Fountains, pools and cascades of water will have an important part in decorative effects. Such features have required contracts for close to $200,000 worth of pumps. Many of these are stream-lined with chrome-plated bolts and fittings.

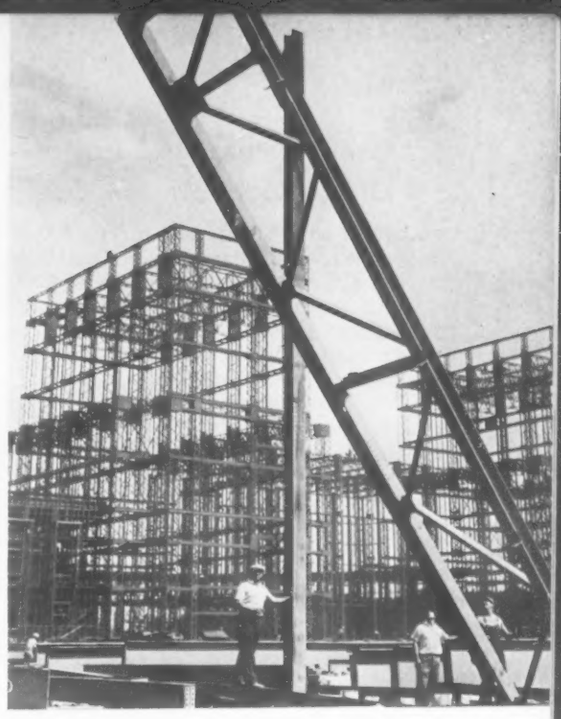
Among the unusual displays will be "world's largest weather vane," 72 feet long, constructed of stainless steel and mounted on a 110-foot copper mast, directing attention to the American Radiator & Standard Sanitary Corp. building.

Covered by sheets of corrugated metal, the Petroleum Industry exhibition building, 80 feet high, required 638 tons of structural steel. The exterior sheets will be finished in three tones of blue. Exterior walls will be constructed in four flaring tiers suggestive of a cooling tower, and exhibits will be housed in four large replicas of oil tanks. A derrick, 199 feet high erected alongside the building, will demonstrate the technique of oil drilling.

An order for 100 all-steel busses has been placed with the Yellow Coach division, General Motors Truck Corp. These busses, to be run by the Greyhound Lines, will be 45 feet long and 9 feet wide. Standard vehicles are 33 feet long, 8 feet wide.

An S-shaped structure nearly a quarter of a mile long will house the elaborate railroad exhibit which will include a working model railroad complete in every detail. Twenty-six eastern carriers are cooperating in this. In an outdoor display there will be a pageant of transportation, for which a grandstand with 4000 seats is being erected.

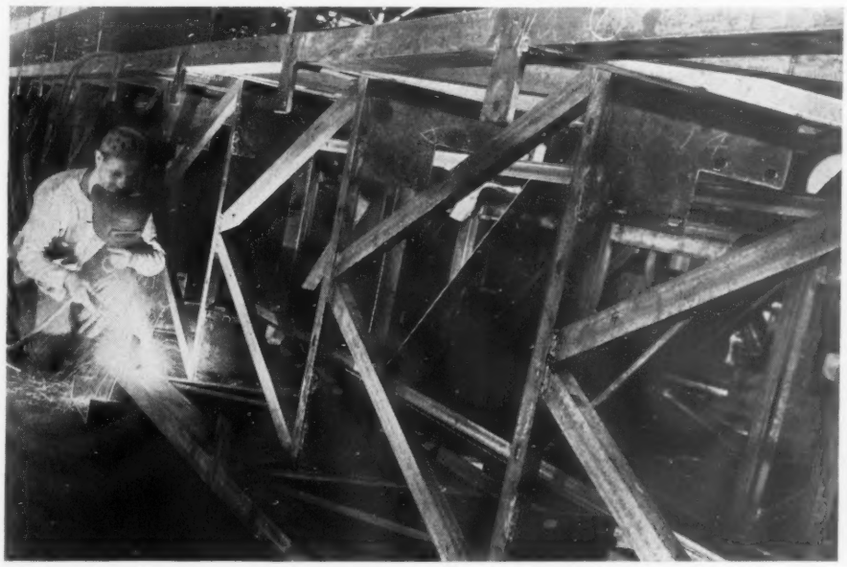
A modern version of the perambulating staircase, to be installed in the Theme building, is rapidly taking shape at Westinghouse Electric Elevator Co.'s Jersey City works. Leading to the upper platform of the Perisphere, it will be 120 feet long and have a vertical rise of 60 feet. Two feet wide, the shining belt of nickel steel and glossy micarta, finished in the orange and buff colors of the fair, will pour 4000 visitors an hour into the "wonderland of the future." Its treads, so constructed that passengers will be riding in absolute safety, will whirl upward at the rate of 90 feet per minute. At the top, it will open directly upon a large revolving platform.



■ **Erecting steel for United States government building**

A companion stairway will be built from the entrance to the interior of the Trylon. This electric carrier, also 2 feet wide and capable of accommodating 4000 persons per hour, will be 96 feet long, with a vertical rise of 48 feet. The total cost of the two moving stairways is over $80,000.

Steel and metalworking companies which have taken space thus far include: American Chain & Cable Co.; American Hardware Corp.; American Radiator & Standard Sanitary Corp.; Bemis & Call; Bendix Aviation Corp.; Bethlehem Steel Co.; Carrier Corp.; Chicago Flexible Shaft Co.; Crane Co.; E. I. du Pont de Nemours & Co. Inc.; Estate Stove Co.; Ferro Enamel Corp.; Ford Motor Co.; Gas Exhibits, including 169 member companies, American Gas association; General Bronze Corp.; General Electric Co.; General Motors Corp.; The Hoover Co.; I. L. G. Electric Ventilating Co.; International Business Machines Corp.; Johns-Manville Sales Corp.; Jones & Laughlin Steel Corp.; Link-Belt Co.; Mosler Safe Co. Inc.; National Cash Register Co.; Otis Elevator Co.; John A. Roebling's Sons Co.; Singer Shaver Co.; Sperry Gyroscope Co. Inc.; The Stanley Works; Texas Gulf Sulphur Co.; Timken Roller Bearing Co.; United States Steel Corp.; Underwood-Elliott-Fisher Co.; Westinghouse Electric & Mfg. Co.; White Sewing Machine Co.; Yale & Towne Mfg. Co.; York Safe & Lock Co.



■ **Welding truss for electric stairway. Leading to upper platform in the Perisphere, it will be 120 feet long, have a vertical rise of 60 feet. A belt of nickel steel, with safety treads, will carry 4000 passengers an hour into the "wonderland of the future"**

Great Expansion in Diesel Locomotive Plant

■ With completion of a 300,000 square-foot addition to Electro-Motive Corp.'s diesel locomotive plant, La Grange, Ill., last week, manufacturing area was increased approximately two-thirds to a total close to 14 acres.

This expansion by the General Motors subsidiary is the second since the plant was opened in January, 1936. Employment has been increased to 2000, from 350. It now has capacity for one complete locomotive per working day. A total of 225 switching and high-speed passenger locomotives has been produced.

According to H. L. Hamilton, president of the company, railroads now are demanding a high-speed diesel-electric locomotive for main line freight service and 1939 will see the first of these put into service.

The all-welded steel framework of the first structure was the world's largest at that time, and this method of construction was continued in the latest addition, 360 feet wide, 820 feet long.

Detroit Forum To Feature Research and Invention

■ A forum on "Invention and the Engineers' Relation to It" will be held at Hotel Statler, Detroit, Nov. 11, under sponsorship of the American Engineering council and the Michigan Engineering society. The program includes luncheon, dinner and afternoon and evening sessions.

Among addresses scheduled are: "Social and Industrial Values of Research and Patents," by Kenneth H. Condit, assistant to president, National Industrial Conference board, New York; "Place of Government in Research," by Dr. Lyman J. Briggs, director, national bureau of standards, Washington; "Putting Research to Work," by T. A. Boyd, head of fuels department, research laboratories division, General Motors Corp., Detroit; "Economic Aspects of the Patent Survey," by Harry H. Semmes, chairman, patents committee, American Bar association, Washington; and "Patents—One Product of Research," by Dr. Frank B. Jewett, vice president, American Telephone & Telegraph Co., New York.

Stainless Steel Bears Message to Posterity

■ An engraved stainless steel plate, estimated "good for 6000 years," has been placed in a posterity box in the foundation stone of a new British hospital being erected at Buenos Aires, Argentine Republic. Funds for the hospital, about $2,000,000 Argentine paper, were contributed by British and American communities.

The plate, of Maxilvry stainless steel, manufactured by Edgar Allen & Co. Ltd., Sheffield, Eng., is inscribed: "This plate is deposited by the British Chamber of Commerce in the Argentine Republic in testimony of their admiration and very best wishes for the success of the new British Hospital in its noble mission of alleviating suffering."

Health, Safety, Good-Will In Company's Open House

■ Hamilton Foundry & Machine Co., Hamilton, O., recently held open house for employes, families and friends, and 711 persons were registered. Peter E. Rentschler, president, addressed them prior to an educational movie program, which included several reels illustrating tuberculosis contacts. The latter were explained by Dr. W. J. Smith, chief, bureau of tuberculosis, Ohio state department of health.

The program was repeated in the evening for executives, supervisors, office employes and guests from other plants. Addresses were made by Charles G. Barth, safety engineer, industrial commission of Ohio, and Stanley Ogg, field investigator for the commission.

Subsequently another open house was provided when 250 designers, buyers and users of iron castings inspected the plant.

The company has been carrying on an intensive health program among employes. It has inaugurated an extensive safety program and has taken membership in the National Safety council.

Schedule of Exhibitions Issued in Fourth Edition

■ Exhibitors Advisory Council Inc., 122 East Forty-second street, New York, has issued its fourth annual schedule of important industrial, trade, commercial, professional, and other types of shows and exhibitions, to be held in 1939. The schedule is the largest listing yet compiled and represents a substantial increase over the 1938 and 1937 editions. Copies are available from council headquarters at $4 each.

Each listing includes the name of the show, date and location, and, for the first time, the address of the sponsor. Easy reading is afforded by an index which classifies the shows according to industries, trades, professions, etc.

The council, which is composed of industrial and trade companies and groups interested in exhibiting in shows, has for the past 13 years served as a clearing house for information on exhibits and fairs.

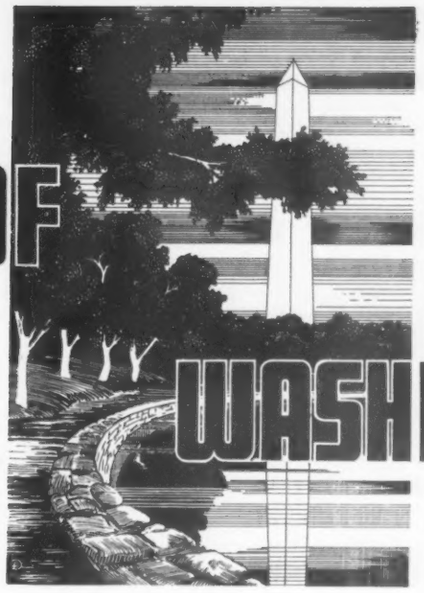
Bar Mill Rate Unchanged

■ Wage rates for puddlers and bar mill workmen affiliated with the Amalgamated Association of Iron, Steel and Tin Workers for November are unchanged from October. Card rate on boiling, bar and 12-inch mills is $2.25; for guide and 10-inch mills, $2.35.

Stainless Steel on the Stage

■ **Eighteen hundred square feet of mirror-like Ludlite, stainless steel product of Allegheny-Ludlum Steel Corp., Brackenridge, Pa., was used recently, in this spectacular stage show in Radio City Music Hall. Designed especially for decorative purposes, the steel is rolled in strips 24 inches wide to a gage of 0.0095 inch, and has a flexible backing of non-metallic material**

WINDOWS OF WASHINGTON



BY L. M. LAMM
Washington Editor, STEEL

WASHINGTON

■ CONFUSION still exists at the headquarters of Elmer F. Andrews, wage and hour division, and presumably will continue until business men understand the law. Many communications asking for exemptions and special rulings are in Mr. Andrews' office and with the present small personnel, it will be a long time before these matters can be adjusted.

One question of prime importance in the new law, which became effective Oct. 24, is the fact employes can sue employers. This has disturbed Mr. Andrews considerably, but he has the assurance of the AFL and the CIO that they will urge their members to go slowly in filing any cases.

Green Pledges Restraint

Last week Mr. Andrews said he should like to add a word of "caution to employes against ill-advised suits. Officials of both the AFL and the CIO have told me that they intend to advise their members to go slowly. This does not mean that any employe who is the victim of injustice should forfeit his right under the law. Any such victim should promptly seek the redress to which he is entitled. But no employe should bring suit under the fair labor standards act simply in an effort to hamper or intimidate his employer. The wage and hour division intends to use its full powers to guarantee fair treatment to both employe and employer."

In connection with the new law, William Green, AFL president, made the following statement: "This law, of course, is primarily directed toward improving the condition of oppressed workers. At the same time it can and should prove of inestimable value to industry.

"Here is a great opportunity for the stabilization of industry and the eradication of chiseling competition. Effective administration of the law will wipe out the menace to legitimate industry hitherto provided by sweatshop employers.

"I urge the public and all employers to observe and obey this law for another important reason. By setting up minimum standards of wages, it will stabilize the nation's purchasing power. It will prevent shrinkage of buying power beyond definite limits by providing a rock bottom below which wages cannot sink.

"There is so much to be gained from this law by every factor in the nation's economic life that its benefits should not be wasted either by excessive zeal or implacable prejudice. I pledge that the American Federation of Labor will carry out its responsibilities under the act with patience and restraint. We will co-operate in every way with with Administrator Andrews to make the law a success. I urge the public and business likewise to give it a fair chance."

UTILITY CONSTRUCTION PROGRAM ANNOUNCED

Leading utility companies in the nation's strategic war material centers will place immediately orders for turbo-generators, boilers and auxiliary equipment totaling 1,000,000 kilowatts of generating capacity, President Roosevelt's national defense power committee announced last week.

New facilities will be co-ordinated in peace time with existing facilities to make them quickly available in the event of war and the government shall have first call on them in event of war.

Chairman Louis Johnson of the power committee emphasized the commitments made by the utilities for these new plants are only the first step in the committee's program to remove "bottlenecks" in the power supply.

NAM STUDIES EFFECTS OF RECIPROCAL TRADE PACTS

The tariff committee of the National Association of Manufacturers has just completed a study of reciprocal trade agreements.

"The reciprocal trade agreement program which was launched over four years ago is once again becoming a major topic of industrial interest," the report said. "Among the many reasons why this is true is the fact that it is expected that an agreement will shortly be completed with the United Kingdom.

"Sufficient time has now passed to determine how this program has worked out. There have been many heated arguments regarding the policy now being followed by the department of state. It is apparent that many of the questions which have been raised can be cleared only through a critical anlysis and investigation of our foreign trade under this policy.

"The tariff committee of the National Association of Manufacturers, believing that the continuation of the trade agreement program in its present form is of serious import to industry, agriculture, and labor, has proceeded to analyze thoroughly and dispassionately our foreign trade under the reciprocal trade agreements program."

Three major conclusions were outlined:

The dollar value of all imports on which concessions were made did not increase any faster than the dollar value of all dutiable imports.

While quantity of all imports increased 52 per cent between 1934 and 1937, quantity of items on which

tariff rates were reduced increased 123 per cent.

The value of all dutiable imports increased 93.4 per cent from 1934 to 1937 whereas value of all exports increased only 56.9 per cent.

ANNOUNCE TRANSPORTATION CONFERENCE AGENDA

Advisory committee of the Transportation Conference of 1938 has announced an agenda for the second meeting of the conference in Washington, Nov. 21-22.

The conference, which is an autonomous body made up of transportation operators, users and investors, held its organization meeting in Washington a month ago. At that time the conference authorized the appointment of an advisory committee to draft an agenda and to fix the date for a second meeting.

At its meeting here last week, the advisory committee had before it a large number of proposals for improving the railroad situation out of which it selected five major topics for consideration at the conference. These are: Rate provisions; co-ordinating consolidations and abandonments; relief from hampering burdens and restrictions; government financial aid; and financial reorganization of railroads.

In drafting the agenda, the advisory committee had clearly in mind the necessity of limiting the list of subjects to those upon which the widely diversified interests represented could unite.

FINDS TRADE ASSOCIATIONS CO-OPERATING IN INQUIRY

Only one trade association up to this time has refused to co-operate with the department of commerce in its survey of trade associations. Replies have been received from 100 trade associations out of 2300 to which questionnaires were sent in September.

Discussing the reception of the questionnaires by trade associations, Richard C. Patterson Jr., assistant secretary of commerce and the commerce department's representative on the national economic committee, made the following statement:

"Reports from the field indicate that the schedules sent to trade associations on Sept. 26 have received a splendid reception. Association executives in the various cities visited by our field men during the past three weeks have exhibited a sincere desire to co-operate on this study. Of the 2300 national and interstate trade associations to which the inquiries were sent, only one association has definitely expressed an unwillingness to co-operate.

"So far approximately 100 active associations have forwarded completed copies of the schedule to Washington. The return thus far is about as we expected, knowing that most association secretaries, after completing the schedule, would send it for examination to the members of their boards of directors. Taking this fact into consideration along with the detailed character of the schedule, consisting, as it did, of 34 major questions and a number of sub-questions, and requiring considerable information not readily available, we have anticipated that the bulk of the returns would not be in our hands until Nov. 15.

"This survey is the first time the federal government has studied this special phase of American business life so thoroughly. The explanation of the very satisfactory co-operative attitude toward the department of commerce in this survey lies partly in the realization by association executives that a detailed impartial study of all national and interstate associations will clarify many conflicting issues and should result in greater understanding by the general public of the trade association movement. Association men also realize it will furnish them with much helpful information on the vast scope of associational activities."

AFL URGES SENATORS TO VOTE AGAINST SMITH

AFL's William Green last week sent a letter to senators and senatorial candidates calling attention to the resolution passed by his organization protesting Donald Wakefield Smith's reappointment to the national labor relations board, and urging confirmation be defeated.

In addition to the resolution, the report of the resolution committee unanimously adopted by the AFL convention was included. The report: "Your committee, in addition to recommending the adoption of these resolutions, further recommends that the president of the American Federation of Labor be directed to request each candidate for United States senate in the November election, to declare his intentions for or against confirmation of Donald Wakefield Smith's nomination before election day. And that the officers of the American Federation of Labor leave no stone unturned, or any avenue unexplored, for the purpose of preventing the confirmation by the senate of Donald Wakefield Smith as a member of the national labor relations board.

"The report of the committee was unanimously adopted."

RECOMMENDATIONS MADE ON IRON, STEEL WAGES

Public contracts board has made its final determination on iron and steel wages under the Walsh-Healey act and presented its recommendations to Secretary of Labor Perkins. It is understood Miss Perkins has not yet decided whether she will make the recommendations public before making the wages effective.

LABOR BOARD ASKS COURT REVIEW IN FANSTEEL CASE

United States Supreme Court last week was asked by the national labor relations board to review the judgment of the circuit court of appeals for the seventh circuit setting aside an order for the Fansteel Metallurgical Corp., North Chicago, Ill., in which it was held the employer has the right to discharge employes who seize property in a sitdown strike.

In February last year, there was a sitdown strike in the North Chicago plant of the company, and the court ruled against the striking employes. The labor board in its order found the sitdown strike resulted from the failure of the company to bargain with employes belonging to the Amalgamated Association of Iron, Steel and Tin Workers.

Contention is made in the labor board's petition for review that the question involved "is of basic importance in the proper administration of the labor act.

"If employe misconduct," it added, "terminates their status as employes under the act, exempts employers from their duties imposed by the act to refrain from interfering with, restraining or coercing their employes and to bargain collectively with their representatives, and prevents the board from issuing remedial orders to correct unfair labor practices, a large field in which the board's activities are of the most vital importance are put beyond the powers intended to be conferred upon the board by congress."

The strikers were evicted from the plant in February and the board ordered the reinstatement of 92 men who had been discharged when the sitdown began.

TWENTY TIN PLATE SCRAP EXPORT LICENSES GRANTED

During September authorization was granted for 20 licenses for the export of tin plate scrap. Japan was the country of destination for all the licenses issued which totaled 1884 long tons valued at $32,749.

RFC LOANS SINCE FEBRUARY AGGREGATE $693,801,566

Jesse Jones, chairman, has announced that since the RFC resumed lending late in February this year, it has authorized 4286 loans aggregating $693,801,566.03. Of these loans, 3793 totaling $128,994,669.36 were to business, including $3,969,762.66 later taken up by banks. Banks participated in 915 business loans to the extent of $28,043,397.73, making a total of $153,068,304.43 loans to business.

Exports, Imports Up in September

■ Exports of steel and iron products, excluding scrap, in September checked the decline which had persisted since January, according to the metals and minerals division, department of commerce.

September shipments, exclusive of scrap, totaled 196,395 gross tons valued at $11,176,437, compared with 134,110 tons valued at $8,810,925 in August, an increase of 46.4 per cent in volume and 26.8 per cent in value.

For nine months they aggregated 1,585,147 tons valued at $105,174,317, against 2,530,347 tons valued at $155,954,327 in the corresponding period, 1937. For the same interval in 1929 they were 1,947,265 tons, value $159,608,810.

Foreign shipments of scrap in September totaled 149,673 tons, worth $2,093,925, in comparison with 108,029 tons worth $1,478,545 in August, and 256,191 tons valued at $4,815,993 in September, 1937. Japan took 60,619 tons, Italy 32,202 tons, Germany 20,433 tons, the Netherlands 19,144 tons and Poland 10,552 tons.

September imports, exclusive of scrap, were 23,740 gross tons valued at $1,332,092, compared with 18,404 tons valued at $1,182,741 in August and 28,505 tons valued at $1,908,645 in September, 1937. This is an increase of 39.5 per cent over August. Scrap imports in September were 4218 tons, all from Canada.

FOREIGN TRADE OF UNITED STATES IN IRON AND STEEL

Gross Tons

	1938		1937	
	Exports	Imports	Exports	Imports
Jan.	586,294	29,631	201,692	43,063
Feb.	460,640	19,589	290,987	40,728
March	526,883	11,827	570 584	51,805
April	489,202	21,237	683,674	68,197
May	540,639	20,814	969,222	49,050
June	312,021	15,887	826,534	44,771
July	263,699	14 728	889,438	47,012
Aug.	242,139	20,041	836,319	61,489
Sept.	346,068	27,958	543,740	37,071
9 mo.	3,767,585	181,712	5,862,237	443,186
Oct.	.....	.....	522,611	37,186
Nov.	.....	.....	556 691	26,996
Dec.	.....	.....	626,418	25,792
Total	.....	.....	7,567,884	553,160

ORIGIN OF SEPTEMBER IMPORTS

Gross Tons

	Iron ore	Pig iron	Manganese ore	Ferromanganese
Sweden	40,364	.....	.....	.....
Canada	310	.....	.....	.....
Cuba	32,000	.....	7,149	.....
Chile	110,350	.....	.....	.....
Australia	5,008	.....	.....	.....
Netherlands	.....	6,820	.....	1,579
British India	.....	102	1,729	.....
Soviet Russia	.....	.....	16,016	.....
Gold Coast	.....	.....	7,732	.....
France	.....	.....	.....	226
Norway	.....	.....	.....	1,411
Czechoslovakia	.....	.....	.....	671
Total	188,032	6,922	32,626	3,887

	Sheets, skelp and sawplate	Structural steel	Steel bars	Hoops and bands
Belgium	2	1,716	616	661
Germany	181	69	144	194
Sweden	1	.....	205	1
United Kingdom	4	5	14	.....
Canada	1	.....	5	.....
France	.....	112	140	66
Czechoslovakia	.....	.....	1	.....
Total	189	1,902	1,125	922

UNITED STATES IMPORTS OF IRON AND STEEL PRODUCTS

Gross Tons

Articles	Sept. 1938	Aug. 1938	Jan. thru Sept., '38
Pig iron	6,922	961	29,184
Sponge iron	31	8	362
Ferromanganese (1)	3,887	1,675	11,940
Spiegeleisen	1,069	955	7,051
Ferrochrome (2)	1	.....	100
Ferrosilicon (3)	180	54	549
Other ferroalloys (4)	.....	.....	1
Steel ingots, blooms	158	.....	165
Billets	19	73	470
Concrete reinforc. bars	105	248	1,015
Hollow bar, drill steel	72	56	604
Bars, solid or hollow	1,125	1,546	14,053
Iron slabs	.....	.....	.....
Iron bars	7	105	447
Wire rods	564	220	3,582
Boiler and other plate	24	151	295
Sheets, skelp, saw plate	189	294	5,768
Die blocks or blanks	1	1	68
Tin plate, taggers' tin and terneplate	4	24	83
Structural shapes	1,902	2,335	28,691
Sashes and frames	.....	.....	.....
Sheet piling	.....	.....	.....
Rails and fastenings	669	232	2,884
Cast-iron pipe, fittings	50	173	1,121
Malleable iron pipe ftgs.	11	14	67
Welded pipe	183	1,131	4,105
Other pipe	2,156	1,557	17,364
Cotton ties	868	2,626	6,825
Other hoops, bands	922	908	12,559
Barbed wire	671	1,068	10,257
Round iron, steel wire	167	118	969
Telegraph, telephone wire	1	1	7
Flat wire and steel strips	180	154	1,852
Wire rope and strand	214	156	1,588
Other wire	49	96	1,064
Nails, tacks and staples	739	831	5,667
Bolts, nuts, and rivets	62	1	156
Horse and mule shoes	39	52	339
Castings and forgings	499	580	2,801
Total (gross tons)	23,740	18,404	174,053
Iron and steel scrap	4,218	1,637	7,659
GRAND TOTAL	27,958	20,041	181,712

(1) Manganese content; (2) chrome content; (3) silicon content; (4) alloy content.

UNITED STATES EXPORTS OF IRON AND STEEL PRODUCTS

Gross Tons

Articles	Sept. 1938	Aug. 1938	Jan. thru Sept., '38
Pig iron	66,600	19,756	312,507
Ferromanganese and spiegeleisen	1	2	227
Other ferroalloys	129	95	930
Ingots, blooms, etc.:			
Not containing alloy	3,916	539	140,652
Alloy incl. stainless	2,054	178	7,214
Steel bars, cold-fin.	328	812	11,216
Bars, iron	180	49	1,123
Bars, concrete	1,610	2,870	14,946
Other steel bars:			
Not containing alloy	6,712	7,834	81,890
Stainless steel	265	53	543
Alloy not stainless	887	269	3,693
Welding rods, electric	67	64	798
Wire rods	508	357	19,144
Boiler plate	788	431	5,961
Other plates, not fab.:			
Not containing alloy	7,329	12,118	132,808
Stainless steel	100	7	243
Alloy not stainless	24	19	2,017
Skelp iron or steel	3,469	2,614	13,724
Sheets, galv. iron	315	406	2,993
Sheets, galv. steel	6,141	4,539	51,932
Sheets, "black" steel:			
Not containing alloy	16,362	11,650	140,971
Stainless steel	42	120	1,462
Alloy not stainless	206	179	2,682
Sheets, black iron	676	881	5,657
Strip steel, cold-rolled:			
Not containing alloy	2,228	2,037	18,724
Stainless steel	39	13	329
Alloy not stainless	102	25	273
Strip steel, hot-rolled:			
Not containing alloy	3,228	2,792	24,259
Stainless steel	20	1	124
Alloy not stainless	2	3	47
Tin plate, taggers' tin	12,061	9,163	123,253
Terne plate	246	372	3,535
Tanks, except lined	5,341	5,301	30,464
Shapes, not fabricated	5,131	4,032	64,624
Shapes, fabricated	3,144	2,692	27,260
Plates, fabricated	2,511	575	20,666
Metal lath	81	25	694
Frames and sashes	55	149	1,031
Sheet piling	37	599	2,588
Rails, 60 lbs.	1,139	1,406	34,975
Rails, under 60 lbs.	82	71	4,079
Rails, relaying	12,596	11,188	28,057
Rail fastenings	1,207	918	6,115
Switches, frogs	151	81	1,325
Railroad spikes	142	762	1,997
R.R. bolts, nuts, etc.	81	182	740
Boiler tubes, seamless	691	614	9,432
Boiler tubes, welded	45	23	1,395
Pipe:			
Seamless casing, oil-line	2,539	2,291	38,799
Do., Welded	293	129	9,541
Seamless black, except casing	523	517	5,429
Pipe fittings:			
Mall. iron screwed	239	297	2,326
Cast iron screwed	93	134	1,407
Pipe and fittings for:			
Cast-iron pressure	2,303	5,770	15,587
Cast-iron soil	905	687	7,424
Pipe, welded:			
Black steel	796	862	7,737
Black wrought-iron	689	401	2,501
Galvanized steel	1,620	1,016	9,595
Galv. wrought-iron	85	283	1,719
Pipe and fittings:			
Riveted iron or steel	7	.....	937
Wire:			
Plain iron or steel	2,934	1,230	17,158
Galvanized	2,139	1,153	17,093
Barbed	4,767	3,115	22,974
Woven wire fencing	156	144	1,485
Woven wire screen cloth:			
Insect	14	26	176
Other	82	80	812
Wire rope and cable	218	284	2,732
Wire strand	98	18	671
Card clothing	8	16	58
Other wire	460	363	4,195
Wire nails	1,974	1,654	13,959
Horseshoe nails	32	44	649
Tacks	47	13	182
Other nail, staples	414	325	3,089
Bolts, machine screws	625	565	5,969
Castings:			
Gray iron, semi-steel	448	298	2,804
Malleable-iron	34	44	954
Steel, not alloy	177	111	1,077
Alloy incl. stainless	43	58	615
Car wheels, tires, axles	1,347	1,759	17,233
Horseshoes and calks	3	4	59
Forgings, n.e.s.:			
Not containing alloy	1,162	913	6,574
Alloy incl. stainless	52	10	308
Total	196,395	134,110	1,585,147
Scrap, iron and steel	147,203	106,883	2,164,857
Scrap, tin plate	1,578	764	8,744
Tin plate circles, strips, cobbles, etc.	284	144	3,545
Waste-waste tin plate	608	238	5,292
Total scrap	149,673	108,029	2,182,438
GRAND TOTAL	346,068	242,139	3,767,585
Iron ore	96,628	121,703	429,994

Implement Exports 9 Per Cent Lower

■ Farm equipment exports from the United States in September were 9 per cent less than last year, according to the machinery division, department of commerce. Value of September exports was $5,434,837, compared with $7,074,986. All the major types of equipment, except threshers, plows and fuel injection type of tracklaying tractors declined.

On all tables, like the one illustrated, built by the **YOUNGSTOWN FOUNDRY & MACHINE COMPANY,** Hyatt Roller Bearings are selected for a majority of the bearing positions.

Evidence of Hyatt reliability is found everywhere. In service on tables, cranes, motors, cars, and auxiliary mill equipment, Hyatt Roller Bearings are sturdy, smooth and dependable . . . faultless in design and workmanship, carefree in operation. The countless number of Hyatts applied each year to new equipment and changeovers roll on unheeded, except by the engineers and mechanics who have learned to specify and depend on Hyatt Roller Bearings. Hyatt Bearings Div., General Motors Corp., Harrison, N. J.; San Francisco. Hyatt Roller Bearing Sales Company, Chicago and Pittsburgh.

HYATT *Roller* BEARINGS

MIRRORS OF MOTORDOM

BY A. H. ALLEN
Detroit Editor, STEEL

Material appearing in this department is fully protected by copyright, and its use in any form whatsoever without permission is prohibited.

DETROIT

■ AS THE automotive industry moves into the November show season, every available sign or indicator points to fair weather ahead. Employment is nearing the 350,000 level about 85 per cent of peak; production is at the highest rate since last December and is still climbing; stocks in the hands of dealers are said to be well under 100,000 cars; unfilled orders are heavy and guarantee good production through the end of the year; salaries are in process of being adjusted upward; prices are down and additional values have been built into new models.

What other elements could be asked for to insure automotive prosperity? At least one—and that is the incidence of stability and sound business practice in Washington. This is the stickler which mars the outlook for the long range in automobiles. Few worries are heard over the remaining two months of this year, but it is felt the results of the November elections throughout the country will have a major bearing on the industry's well being in 1939.

See 3,500,000 Total

Department of commerce figures for automobile production in September show 89,623 cars and trucks for United States and Canada, the lowest monthly total since November, 1934, when production dipped to 85,000.

October should see a sharp rebound from this low, with the total coming close to 250,000. It is possible November and December may attain the 400,000-mark, which would bring the year's output to somewhere in the neighborhood of 2,690,000 units, just a little over half the 5,000,000 total registered during last year.

Taking the recent estimate of W. S. Knudsen, president of General Motors Corp., indicating a maximum of 33 1/3 per cent improvement for 1939, a total of 3,500,000 is presaged for 1939.

Back from a six-weeks' sojourn in industrial Europe, Mr. Knudsen repeated his views on the 1939 outlook, and gave some figures on production of GM foreign plants. He said that in Denmark and Sweden, production quotas were set by the government at 3000-4000 per year, while the Opel plant in Germany was turning out about 400 cars per day, and the British plant about 200 cars a day.

■ HUPMOBILE continues to make an earnest struggle for a share of business in the coming year and has restyled and rechristened its 115-inch wheelbase Cordish-looking car illustrated here several weeks ago. This small job will be known as the Skylark and the front end has been rounded off, with a semicircular set of six horizontal louvers surmounting two lower catwalk grilles, the latter with vertical bars. New front fender and grille dies were required, and Briggs is making several models to be on display at the New York and Chicago shows. As yet it is not definite where the bodies ultimately will be made, and it will be 60 days before any production of the new automobile is started.

The Skylark will be powered by a 6-cylinder 101-horsepower engine, with the 4-cylinder version deferred until spring. Hupmobile sales officials were quick to squelch the report heard locally that plans were being drawn up to open a number of joint Hupp-Willys dealerships in Detroit.

The tip also is being passed around this section that Studebaker will have a new 4-cylinder job ready for display within the next few months. Nash, of course, already has had sample bodies built up for its entrant in the small-car field, but reportedly is deferring production until next year.

Sales reports for the second 10-day period of October show that Buick retail deliveries totaled 6697, a new high for the period and 16 per cent over the same period last year. New car orders received in this period exceeded deliveries by over 2000. Assembly operations have been geared to this accelerated demand and are currently on the basis of 1000-1200 daily.

Last of the automobile previews for newspaper men was held Monday by Ford. Guests first were taken on a tour of the Rouge plant to inspect details of the $34,000,000 expansion program which now is virtually completed.

New cars were unveiled later and revealed a considerable change in styling. Lines include standard 60, deluxe 85, Mercury and Lincoln.

Mercury Draws Attention

Center of attention naturally was the new 116-inch wheelbase Mercury which showed a distinct Zephyr treatment of the front end although, as reported here previously, the catwalk grilles extend clear across the lower front end, the parallel horizontal bars in the grille being unbroken except for a narrow center strip.

Incidentally, all fenders, hoods and frames for the Mercury are being manufactured by Murray here, as well as about one-third of all other Ford frames, according to *Ward's Automotive Reports*. Bodies for the Mercury line are being built in the Briggs Highland Park plant, and

production is now up to several hundred weekly.

■ A MEASURE of quiet has settled over steel buying for the time being after prices were re-established at previous levels. All companies have good tonnages on their books for automotive accounts and additional buying is expected shortly because auto builders have not pursued the policy of buying ahead to any extent.

Local mills are operating at virtual capacity, with the exception of Ford, and additional furnaces probably will be lighted at the latter's steel plant this week. In some circles it is reported that the jacking up of steel prices had the unexpected effect of stimulating new orders.

■ FOLLOWING the ever-changing picture of automotive materials would be the subject of a weekly dissertation in itself. A few of the recent highlights are worthy of mention. For example, Packard recently has made a switch to pearlitic malleable iron for camshafts, replacing previously used forged steel shafts. The shafts are produced by the Saginaw Malleable Iron division of General Motors and their successful application is a tribute to the advanced knowledge of the processing and properties of this material.

Pearlitic malleable has a number of other automotive uses, including rocker arms for Buick and Chevrolet, and experiments have been made on crankshafts. It is said on good authority, however, that a successful automotive crankshaft of pearlitic malleable has yet to be made—but likely will be produced before long.

For a time Packard used cast camshafts made by Campbell, Wyant & Cannon, and then last year went to a forged steel shaft, and installed equipment to harden the shafts by induction heating and automatic quenching. This installation is the familiar Tocco process and has been described in STEEL.

Difficulties were encountered with the original installation of hardening equipment due to warping of the shafts after heat treatment. It was found to cost more to straighten them than to harden them, so the equipment was scrapped and a new installation devised in which the shafts are held rigidly by steady-rests on the three bearings, while the inductor block moves up over the succeeding cams, heating and quenching them. The revised equipment licked the straightening problem and also occupied considerably less space. It is now being used to harden the pearlitic malleable iron shafts. These shafts are claimed to be less expensive than steel, show somewhat better wear because of the higher carbon content, and can be used in conjunction with most any type of tappet.

Packard is pioneering a new use for zinc die castings, in the form of a transmission cover plate, weighing about 3 pounds and supplanting a cast iron cover. Removal of the gear shifting mechanism from the top of the case to the side, as a result of the shifting lever being relocated onto the steering column, left the top of the case free of obstructions, and a die cast cover fitted in nicely.

Another new use for die castings is the door striker plate or bar which Ford has adopted.

Die cast striker plates are not new, being used by several other car builders. A die cast door bolt, to be used on the Mercury, however, is new. Rotary door latches used by Chrysler and Studebaker this year also are die cast.

Die casters are pointing with pride to the new Cadillac hardware which features chrome-plated zinc die castings inlaid with a ruby plastic. The handles and other parts taking this inlay are shaped with the proper depression to receive the plastic, and are drilled so that lugs on the plastic can pass through, the idea being that the plastic can be securely locked in place by touching the reverse side of the lug with a hot iron, causing the plastic to flow slightly.

Willys has recalled 2000 workmen in the past week as 1939 model production gets under way to supply dealers by the time of the automobile show, when official announcement of the new Willys line will be made. Graham in the past two weeks has completed about 500 new jobs, and reports good demand coming in from dealers. One of the main tasks which confronts Graham is to build up strength of dealers' organizations, as it is generally conceded that as far as style is concerned, the car itself is well up among the leaders.

Automobile Production

Passenger Cars and Trucks—United States and Canada

By Department of Commerce

	1936	1937	1938
Jan.	377,244	399,186	227,130
Feb.	300,810	383,900	202,589
March	438,943	519.022	238,598
April	527,625	553,231	238,133
May	480,518	540,377	210,183
June	469,368	521,153	189,399
July	451,206	456,909	150,444
Aug.	275,934	405,072	96,936
Sept.	139,820	175,630	†89,623
9 mos.	3,461,468	3,954,480	1,643,035
Oct.	230,049	337,979	.....
Nov.	405.799	376,629	.....
Dec.	518,958	347,349	.....
Year	4,616,274	5,016,437	.....

*Estimated. †Revised.

Estimated by *Ward's Reports.*

Week ended:	1938	1937†
Oct. 1	25,405	44,330
Oct. 8	37,665	71,958
Oct. 15	50,540	89,680
Oct. 22	68 360	91,905
Oct. 29	73,335	90,155

†Comparable week.

	Week Ended Oct. 29	Oct. 22
General Motors	34,350	31,925
Chrysler	16,750	15,000
Ford	12,875	12,850
All others	9,360	8,585

Tool Engineers' Society To Enlarge Exposition

■ American Society of Tool Engineers announces that its second Machine and Tool Progress exhibition to be held in Detroit next March will be considerably larger than the 1938 show and that it will be extended from four to six days. The show in Convention hall, March 13-18, will be held with the society's national convention.

A substantial increase in attendance is anticipated for the 1939 event, for society membership has doubled in the last 12 months. With new chapters installed in Cincinnati, Schenectady, N. Y., St. Louis, Syracuse, N. Y., York, Pa., Dayton, O., Philadelphia and Rochester, N. Y., the total has been brought to 22. Several more additions are contemplated and expected to be chartered shortly.

Aircraft Figures Double In Two Year Period

■ Manufacturers of aircraft in the United States reported large increases in employment and production in 1937, compared with 1935, according to the census bureau's biennial census of manufacturers. Wage earners in 1937 numbered 24,003, which was 110.8 per cent above 1935 and 207.1 per cent above 1933. Wages totaled $33,352,911 in 1937, exceeding 1935 by 124 per cent and 1933 by 223.6 per cent. Value of products was $106,568,254 in 1937, a rise of 135 per cent from $45,347,030 in 1935 and 266.2 per cent from $18,503,429 in 1933.

Figures include value of instruments and accessories but exclude power plants.

■ Purdue university, Lafayette, Ind., has expanded its school of chemical engineering into a school of chemical and metallurgical engineering. Dr. J. L. Bray will continue to head the school, which is to be housed in a building now under construction.

MODERNIZE WITH . . Smooth Line

HPM

LATEST CONTRIBUTION TO THE METAL WORKING INDUSTRY

Influenced by the modern era of streamlining, the new **H-P-M SMOOTH LINE FASTRAVERSE PRESS** has captured the spirit of the day . . . in up-to-the-minute design . . . attractive appearance . . . reduced weight . . . increased strength . . . compact proportions . . . production speed . . . hydraulic smoothness and flexibility. ● Like all other H-P-M Hydro-Power Presses, dependable performance is assured in the **H-P-M SMOOTH LINE** series by the patented H-P-M Fastraverse system of operation and control. Each press is completely self-contained with power unit including H-P-M 4-R Radial Pump mounted overhead and totally enclosed. All piping and control mechanism is entirely concealed . . . yet every operating element is conveniently accessible for adjustment and maintenance. ● Modernize with the new **H-P-M SMOOTH LINE FASTRAVERSE PRESS.** Write for full details.

THE HYDRAULIC PRESS MFG. COMPANY
MOUNT GILEAD, OHIO, U. S. A.

District Offices: New York, Detroit, Chicago
Representatives in Principal Cities

"Smooth Line" trade-mark registered
U. S. Patent office: design patent applied for.

HPM

HYDRO-POWER FASTRAVERSE PRESSES

"OPERATES AS SMOOTH AS IT LOOKS"

MEN OF INDUSTRY

■ WILLIAM P. LANGWORTHY has been appointed director of electrical materials division, Allegheny Ludlum Steel Corp., Pittsburgh. He formerly was president, Lamination Stamping Co., Hartford, Conn., and in 1930 when the company was merged with Allegheny Steel Co., Mr. Langworthy became manager of the fabrication division, a position he held until his present appointment.

♦

J. E. McMullen has been appointed controller, Colorado Fuel & Iron Corp., Denver, and subsidiary companies.

♦

John D. Tebben has been named sales manager, metallurgical division, P. R. Mallory & Co. Inc., Indianapolis.

♦

W. S. Davis has been named sales manager, Ohio Injector Co., Wadsworth, O. He has been affiliated with the company a number of years.

♦

W. O. Fritze, formerly assistant treasurer, Keystone Steel & Wire Co., Peoria, Ill., has been elected secretary and assistant treasurer. Mr. Fritze has been a director since 1935.

♦

Dr. Walter S. Landis has been selected to receive the Perkin medal of the Society of Chemical Industry for 1939, for his work on cyanamid, derivatives of cyanamid, fertilizers, ammonium phosphate, the first commercial production of argon, and contributions to the explosive industry. The medal will be presented Jan. 6 at a meeting to be held at the Chemists' club, New York.

W. P. Langworthy

♦

Edward R. Stettinius Jr., chairman of the board, United States Steel Corp., New York, has been named general chairman of the annual roll call, New York chapter, American Red Cross, in Manhattan and the Bronx.

♦

Louis Shattuck Cates, president, Phelps Dodge Corp., New York, has been selected for the William Lawrence Saunders gold medal by the board of directors, American Institute of Mining and Metallurgical Engineers.

♦

Edwin W. Thomas has been appointed works manager, Standard Steel Works Co., Burnham, Pa., subsidiary of Baldwin Locomotive Works. Mr. Thomas has been associated with Standard since 1909 and for the past ten years had been assistant works manager.

♦

L. E. Gannon, advertising manager, Palmer-Bee Co., Detroit, has been elected secretary-treasurer, Industrial Marketers of Detroit, a chapter of the National Industrial Advertisers' association.

♦

Carl L. Leafe, associated with Norton Co., Worcester, Mass., about 30 years, has been named superintendent of Norton Co. of Canada Ltd., Hamilton, Ont. He succeeds Albert Johnson, who has been appointed consulting engineer for the Canadian plant.

♦

deWitt H. Gunsolus has been appointed representative, furnace division, Continental Roll & Steel Foundry Co., Coraopolis, Pa., with offices at 534 Vine street, Cincinnati. He will handle sales and engineering of industrial combustion equipment and allied furnace accessories.

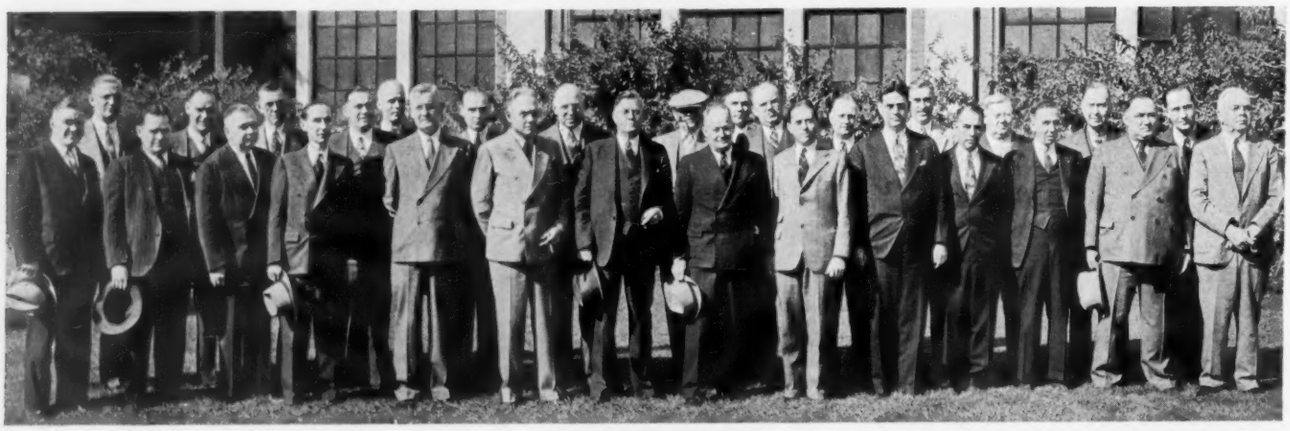
♦

J. Nelson Stuart, until recently advertising and sales promotion manager, Delaware, Lackawanna & Western Coal Co., has become associated with the Kelvinator division of Nash-Kelvinator Corp., as director of advertising, with headquarters in Detroit.

♦

Dr. J. V. N. Dorr, president, Dorr Co. Inc., New York, will be presented with the chemical industry medal of the Society of Chemical Industry at a joint meeting of the American section of that society and the American Chemical society Nov. 4, in recognition of his inventions

Tool Dealers Visit Cincinnati Plants



■ **Members of Associated Machine Tool Dealers of America were guests of machine tool builders in Cincinnati during their annual convention recently (STEEL, Oct. 17, p. 21). Here the group is shown at the plant of the Cincinnati Milling Machine and Cincinnati Grinders Inc.**

of apparatus and processes in many chemical, metallurgical and sanitational operations.

♦

W. F. Bender has become associated with Ohio Steel Foundry Co., Springfield, O., as sales representative in Pennsylvania and West Virginia. He will have his headquarters in Pittsburgh.

♦

Charles H. Hughes, associated with Semet-Solvay Engineering Corp. for many years as research engineer and designer, has resigned to establish his own consulting engineering service at 270 Broadway, New York.

♦

A. J. Hazlett has been appointed manager, strip-sheet sales department, Jones & Laughlin Steel Corp., Pittsburgh. He succeeds William Miller, recently named manager of the corporation's Detroit office. Mr.

A. J. Hazlett

Hazlett's entire business experience has been in the steel industry, and since 1927 he had been president, Eastern Rolling Mill Co., Baltimore.

♦

J. D. Wood has been elected president, Roller-Smith Co. He succeeds the late F. W. Roller. Other officers are: G. L. Crosby, vice president and general manager of sales, and W. J. Schuhmann, treasurer. Main offices of the company will be transferred from New York to the plant at Bethlehem, Pa.

♦

J. N. Walker, heretofore general sales manager, Linde Air Products Co., New York, has been elected vice president, Oxweld Acetylene Co. Both are units of Union Carbide & Carbon Corp., New York.

T. D. Cartledge, formerly assistant sales manager, has been named general sales manager of the Linde company.

♦

Howard F. McMillin has been elected president, Hydraulic Press Mfg. Co., Mount Gilead, O. He succeeds his father, the late F. B. McMillin. Mr. McMillin has been general manager the past two years and also continues in that capacity.

H. A. Toulmin Jr., Dayton, O., has been elected a director to fill the unexpired term of F. B. McMillin.

F. J. Schaeffer

Who has been elected president, National Association of Foreman, as reported in STEEL, Oct. 24, Page 27

♦

B. F. Affleck, former president, Universal Atlas Cement Co., has been elected an honorary member, Western Society of Engineers, which has only eight honorary members. Mr. Affleck is a member of numerous associations, including Portland Cement association, American Iron and Steel institute, American Society for Testing Materials, and the New York and Chicago Engineers' clubs.

♦

Dr. Frank Baldwin Jewett, vice president, American Telephone & Telegraph Co., and president, Bell Telephone Laboratories, has been awarded the 1939 John Fritz gold medal, for "vision and leadership in science, and for notable achievement in the furtherance of industrial research and development in communication." The award is made annually by a board composed of representatives of the four national engineering societies of civil, mining and metallurgical, mechanical, and electrical engineers.

DIED:

■ CHARLES PAESCHKE JR., 55, president, Geuder, Paeschke & Frey Co., maker of metalware, Milwaukee, Oct. 19. Mr. Paeschke's entire business career was with this company, and he succeeded to the presidency in 1936 at the death of his father.

♦

Jacob Groeschel, 67, pioneer manufacturer of sheet metal goods, at his home in Milwaukee, Oct. 22. He founded his own business in 1896.

♦

David Davis, 77, secretary and a director, Ohio Iron & Steel Co., Oct. 21 in Youngstown, O.

♦

James Barnes, 66, superintendent of hot mills, Carnegie-Illinois Steel Corp., Sharon, Pa., Oct. 19.

♦

Frederick S. Phelps, 55, general superintendent, Pacific works, Columbia Steel Co., San Francisco, Oct. 17 in Portland, Oreg.

♦

G. La Rue Masters, 52, vice president, National Lock Washer Co., Newark, N. J., Oct. 25 at his home in South Orange, N. J.

♦

Frank P. Meyer, manager of the engineering department and a director, Pittsburgh Piping & Equipment Co., Pittsburgh, in that city, Oct. 19.

♦

Lewis B. Curtis, 75, president, Curtis & Curtis Co., Bridgeport, Conn., maker of pipe cutters and geared die stocks, in that city Oct. 25.

♦

C. W. Scholle, 47, former vice president, Ohio Injector Co., Wadsworth, O., in Akron, O., Oct. 22. He resigned Oct. 1 due to ill health. He was associated with the company 20 years.

♦

Henry S. Fleming, 75, consulting engineer of New York, Oct. 19 at his home in that city. He was a member, American Society of Mechanical Engineers, American Institute of Mining and Metallurgical Engineers, American Chemical society.

Industrial Machinery Exports Increase

■ Industrial machinery exports in September were valued at $20,355,131, an increase of 9 per cent over the $18,700,797 value a year ago, according to the machinery division, department of commerce.

Larger shipments were recorded in only two of the seven major groups, power-driven metalworking machinery and mining, well and pumping equipment. The former totaled $8,144,947, or 109 per cent over the $3,901,722 in September, 1937. Nearly all items in this group advanced. Exports of metalworking machinery other than power-driven were 30 per cent lower than last year, $250,610 compared with $358,214.

Mining, well and pumping machinery increased 6 per cent to $4,918,233. Construction and conveying machinery at $1,813,839 was down 12 per cent.

Cites Progress in Essential Metals

■ IMPORTANCE of developing production of essential metals from domestic sources was emphasized before the fifth annual metal mining convention and exposition of the American Mining congress, western division, Los Angeles, Oct. 26.

Dr. John W. Finch, director, United States bureau of mines, described growing need for minor metals in modern "tailor-made" alloy steels and efforts by the bureau to provide economical means for their production from domestic ores. Speaking on "Prospects for Minor Metals and Non-Metallic Minerals" he said, in part:

"While the minor metals do not bulk as large in tonnage as copper, lead, zinc, iron, gold and silver, nevertheless they are essential factors in our domestic economy. Recognizing this, the war department includes several of the so-called minor metals on the list of strategic commodities and the navy department has acquired stocks for use in an emergency.

Minor Metals Needed

"Some of the minor metals are of relatively recent importance and in a sense are modern metals associated with speed, reduced weight and durability under adverse conditions. Their extending application in industry is a result of better understanding of metals and alloys designed for specific purposes. A feature of their production is their higher price. An added attraction for producers is excess of demand over domestic production. For many of these essential commodities American industry is dependent on foreign sources for a good share of its requirements.

"Utility of alloy steels is dependent on addition of one or more ferroalloying metals, including chromium, manganese, nickel, tungsten and vanadium. Spurred by need for processes that will enable domestic raw materials to supply demand for minor metals the bureau of mines has been conducting an extensive program of ore testing and metallurgical research, to the point where many minor metal ores may be successfully beneficiated.

"An important objective is to determine possibility of producing deficiency metals, essential to armament and munitions, from domestic ores and wherever possible to promote production for peace-time uses, and thus make them available in an emergency. The program includes known, readily accessible mineral deposits."

Dr. Finch reported success in producing high-purity electrolytic manganese from ores containing 16 to 40 per cent manganese, at a cost of 6 to 7 cents per pound, in contrast to the so-called pure manganese of commerce. Preliminary experiments indicate its use in stainless steel types of alloys. A new method of producing high-purity chromium metal probably will be released in a short time.

The laboratory phase of investigation on production of magnesium from magnesite is progressing and indicates eventual success of a process yielding this metal at moderate cost. Recovery of nickel from domestic ores is under investigation and methods are being developed for production of boron and its alloys and treatment of antimony ores and alunite.

MEETINGS

SOUTHERN STEEL FOUNDRIES FORM TECHNICAL GROUP

■ A MAJORITY of the steel foundries in the South recently established an operating executives group with A. B. Wilkerson, Beaumont Iron Works, Beaumont, Tex., chairman. With formation of this group, under auspices of the Steel Founders' Society of America, the organization of executives in charge of production throughout the steel casting industry is virtually complete. It is estimated that 95 per cent of the industry is now served by similar groups.

The program of activities of the new group will embrace discussions of molding sands and sand control methods, melting practices, ladle supplies and maintenance, employe relationships, cost studies, etc. Main purposes are to promote highest standards of quality in the product and to increase production efficiency.

C. W. Briggs, technical advisor of the Steel Founders' society, Cleveland, will address the next meeting of the group, in December.

MANAGEMENT GROUP PLANS PRODUCTION CONFERENCE

Methods for reducing unit costs, inventory problems, and quality control will receive major attention at the annual conference of the production division, American Management association, Hotel Pennsylvania, New York, Nov. 9-10. Greatest emphasis will be placed on unit costs, a symposium being arranged for production executives from 12 industries including, automotive, chemical, machinery, machine tools, metalworking, and steel.

CLEVELAND ENGINEERS SEE ARMCO COLOR FILM

Cleveland Society of Professional Engineers, Cleveland, inaugurated its winter activities Oct. 21 at a dinner meeting attended by about 300 members and guests. A series of meetings, with speakers and motion picture films, is being arranged.

Bennett Chapple, vice president and director of publicity for American Rolling Mill Co., Middletown, O., spoke on "Pushing Back the Steel Horizon" and presented the company's sound film, "The Romance of Steel."

Arbitration Group Extends Scope

■ HOPE for improved labor-management relations is seen by the American Arbitration association in accomplishments of its voluntary industrial arbitration tribunal. Marking the tribunal's first anniversary last week, the association's president, Franklin E. Parker Jr., pointed to peaceful settlement of more than 100 disputes.

Establishment of this tribunal grew out of the association's 12-year record of success in business and commercial arbitration.

Cases involving seniority rights, union recognition, collection of union dues by employers, even the right of an employer to remove his factory to another city, have been settled peacefully.

Association Names Tribunal

Disputing parties enlist the industrial arbitration facilities by asking the association to appoint a tribunal from its panel of 7000 arbitrators, serving without fee. Parties approve selection, agree to abide by the decision. Laws of 46 states make such agreements to arbitrate irrevocable and enforceable.

Hearings are conducted under the arbitration law of the respective state, in most cases the tribunal having power to subpoena witnesses and take testimony under oath. According to the association rules, the award must be made within 30 days.

Advantages attributed to the plan: Disputes may be settled with greater speed; work is not stopped; nominal fees for each of the parties replace high costs of court and strike procedures; good-will is maintained; need for labor legislation is minimized.

At a dinner in New York recently when the association presented its gold medal for contributions to industrial peace to Edward F. McGrady, former assistant labor secretary, prominent industrialists sat side by side with leaders of the CIO and AFL.

River Shipments Increase Ratio

■ INFLUENCED by the change in the basing point system, steel shippers in the Pittsburgh district are making greater use than ever before of the Ohio river to carry their products to midwestern, southern and southwestern markets.

Because of depressed conditions in the first half, steel river shipments this year will fall below the record established in 1937, but the percentage of total steel production moved via the rivers will probably be the highest in history this year.

The accompanying chart shows the trend of steel river shipments and steelmaking operations in the Pittsburgh district since 1929. From the latter year through 1937, a fairly even variation existed between the two. This year, however, the decline in steel plant operations was much more severe than the drop in water traffic in steel products, and the spread between the two lines has widened perceptibly. This divergence is especially noticeable since June, when revisions in the basing point system became effective and encouraged steel producers to seek low-cost transportation to compete successfully in distant markets.

Steel shipments on the Ohio river during third quarter averaged 101,017 tons monthly, an increase of 33 per cent over the 75,952-ton average the first six months this year. In the same period, Pittsburgh district steelmaking rose from an average of 27 per cent to 30, a gain of only 11 per cent. In other words, compared with the first half, river movement of steel since the change in basing points has expanded three times as fast as total production.

Even without the basing point influence a notable upturn in water delivery would have occurred this year. For example, the monthly average the first half was 117 per cent heavier than the 1932 rate, low point of recent years, while steelmaking showed a gain of only 42 per cent between the two periods.

In the third quarter, steel constituted 11.7 per cent of all products moved over the Ohio. The only other time in recent years the percentage has been this high was in 1930 when river shipments were only slightly above the third quarter average despite the fact mill operations were more than double their recent rate.

More Latitude Urged for Rails

■ "THE VERY commercial existence of the industries in this country has depended, now depends and must of necessity forever depend upon the gigantic and all-encompassing systems of American railroads," C. S. Belsterling, vice president, United States Steel Corp., said in an address before the Associated Traffic Clubs of America, in Cleveland, last Tuesday.

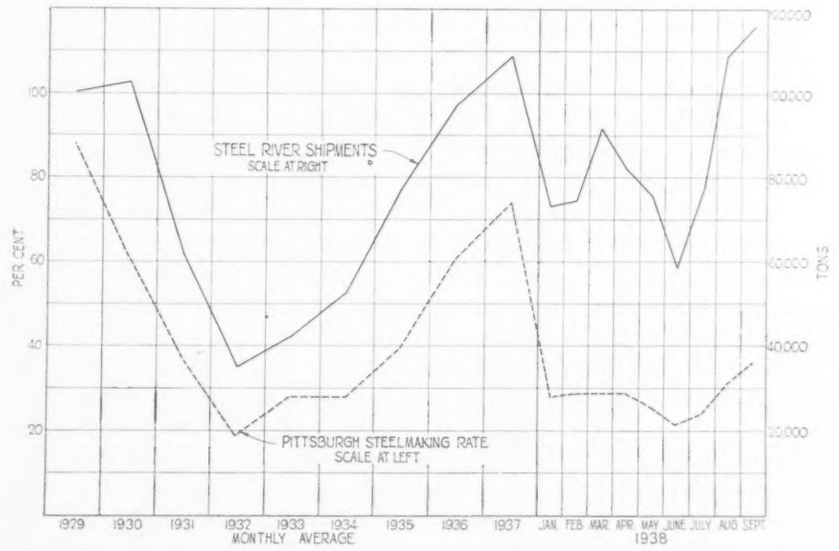
"The abandonment of these great rail systems, in whole or in part, would destroy the trade and commerce of this country, not only between the states, but with foreign nations as well.

"The prosperity of the railroads, therefore, is essential to the common welfare. Our problem is how to increase the traffic density of the railroads in a manner fair and just to all. To state the proposition in another way, the prime needs of the railroads are more traffic and more freedom to manage their own affairs.

"Notwithstanding that from its early inception and throughout its entire history the railroad industry has been baited from many quarters, nevertheless, from a total of 22 miles the railroads as a whole have grown to some 250,000 miles within the comparatively short period of 100 years, representing an investment of over twenty billion dollars, and adequately and efficiently serving the public.

"Motor vehicle transportation is comparatively new; a development of the past 20 years. . . . Overnight delivery of merchandise, long distances from store door to store door is now commonplace. It is this new form of competition, among other changes in the transportation situation, which has rendered obsolete and unworkable many of the provisions of the present interstate commerce act. . . .

"I maintain that the public would best be served if the rail carriers were permitted to own and operate boat lines and motor truck lines, either as extensions of their lines of railroads, or as complements thereto. The motor truck lines and water lines could be used as feeders for the rail lines — the main arteries of interstate commerce."



■ **Steel shipments on Ohio river compared with Pittsburgh district steelworks operations**

Foundry Equipment Makers Discuss Business

■ Fall meeting of the Foundry Equipment Manufacturers' association was held in Cleveland, Oct. 21. In opening the meeting, H. S. Hersey, C. O. Bartlett & Snow Co., Cleveland, president of the association, outlined its purposes, stressed the importance of co-operation.

Earl Turner, Tuscany, Turner & Associates, Cleveland, spoke on "Implications of Recent Labor Legislation", which developed discussion of the fair labor standards act.

A report indicated that while the equipment business for the first six months of 1938 was considerably less than during the same period last year, some improvement has been noted in the past month or two.

Following the luncheon, short talks were made by John A. Penton, chairman, Penton Publishing Co., Cleveland; C. E. Hoyt, executive vice president, American Foundrymen's association, Chicago; and Frank H. Pelton, attorney, Cleveland. H. S. Simpson, National Engineering Co., Chicago, presented motion pictures taken during his recent trip from Australia to San Francisco.

EDITORIAL

25 Years in the Metals Industry

■ REFLECTION upon the National Metal Congress and Exposition in Detroit, Oct. 17-21, recalls to mind that a quarter of a century ago heat treatment of steel, which now is a most important division of the metals industry, was just beginning to develop into an art. Up to that time, the few varieties of steels produced were simple in chemical composition and were utilized largely in the as-rolled condition. The most highly skilled technicians were tool hardeners in the new automobile industry who possessed little theory but good working knowledge of hardening and tempering.

With advent of the World war, automobile plants were hard pressed in production and in an effort to smooth out their difficulties they soon began to employ "steel chemists" who had acquired considerable knowledge on the composition and nature of steels. Immediately a jealousy arose between these chemists and the tool hardeners and they worked together inharmoniously.

First Heat Treating Organization Born in Detroit 25 Years Ago

Sensing that progress would be throttled unless these two groups could be brought together on a common, friendly basis, William P. Woodside, himself a former hardener and then a tool steel salesman, invited a few of these men to a dinner in Detroit on Oct. 4, 1913. This and subsequent informal meetings led to organization of the Steel Treaters' Club, which not only accomplished Mr. Woodside's purpose but thrived. Within four years, this club had become the Steel Treating Research Society with chapters in several cities.

From this modest beginning, just 25 years ago, has sprung the present American Society for Metals which with its membership of 10,000 and its valuable service to the metals industry through educational work, annual conventions and expositions, and general aggressiveness, has gained first rank position among American technical societies. At its annual convention two weeks ago, the society paid a well-earned tribute to Mr. Woodside by elevating him to the presidency.

Throughout its comparatively brief existence, the American Society for Metals has advanced the art of heat treating, has encouraged research in technical phases of the metals industry and has promoted a free exchange of information. All this has provided a stimulating influence to progress and without doubt has been effective in hastening many developments to commercial usefulness.

Major Metallurgical Developments Are Still Comparatively Young

It is interesting to note some of the major developments which have occurred in metallurgy and the treatment of metals during the life of the society. So commonplace are many of them today that it is difficult to believe they are of comparatively recent origin. Foremost, would be the advent of alloy steels and the understanding of the effect of alloying elements. Influence of grain size on steel characteristics has become well recognized. Stainless steels, cemented carbides and powder metallurgy have made their debut. The processes of nitriding and gas carburizing were introduced only a few years ago.

Within the past decade or so, low-alloy high-tensile steels have been perfected and are finding a wide field of usefulness. Tool steels have been improved tremendously and several new types made available. In steelmaking, deoxidizing practice has been investigated searchingly and made a means of controlling quality. Heat treating operations have improved through use of controlled atmospheres and proper quenching.

With this fine record of achievement in a quarter century span, the metals industry can entertain high hopes for the years ahead.

THE BUSINESS TREND

Activity Index Responds to Improved Outlook

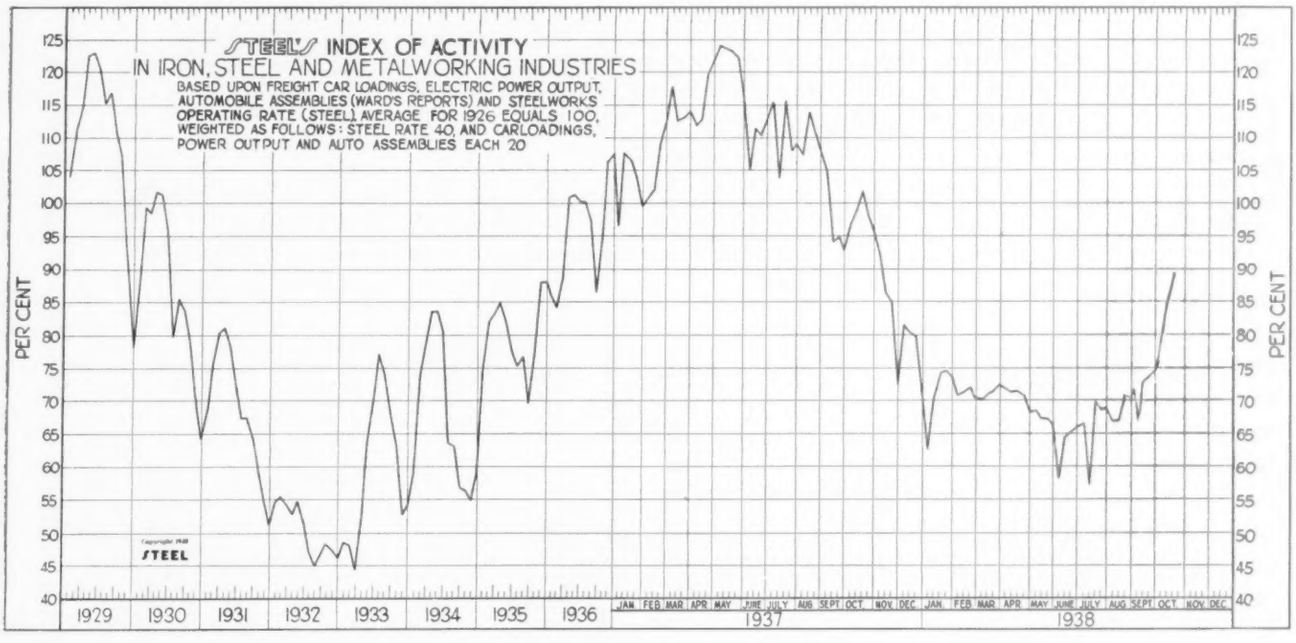
■ RECORDS of industrial activity during October have served to impart a positive tone to the recovery movement, the vague outlines of which took form in the preceding two months.

STEEL'S index of activity in the iron, steel and metalworking industries, which has recorded consistent gains since Labor day week, touched a new high for this year of 88.8 per cent in the week ended Oct. 22. This represents an increase of 4.5 points over the preceding week, but still remains substantially below the 97.5 recorded in the comparable week of 1937.

Steelmaking operations during the week ended Oct. 22 remained unchanged at 51.5 per cent. The failure of this important industrial indicator to continue the encouraging gains noted in the previous two weeks was due primarily to the holding up of orders by many consumers during the period of price weakness on certain flat-rolled steel products. Now that the price concessions have been withdrawn a continuation of the general upward movement in the national steel rate may develop. A year ago the rate stood at 53 per cent. If the improvement in steelworks operations during the week ended Oct. 29 develops as anticipated, the 1938 operating curve may cross the 1937 line for the first time this year.

Encouraged by a steady rising bank of orders, automotive interests substantially increased production schedules during the week ended Oct. 22. Bolstered by an increase of approximately 4000 units by Ford Motor Co., assemblies rose to 68,360 compared with 50,540 in the preceding week and with 91,905 a year ago. This represents a new high for the 1938 calendar year and not since the week ended Dec. 18, 1937, when assemblies totaled 82,025, has the industry made so good a showing.

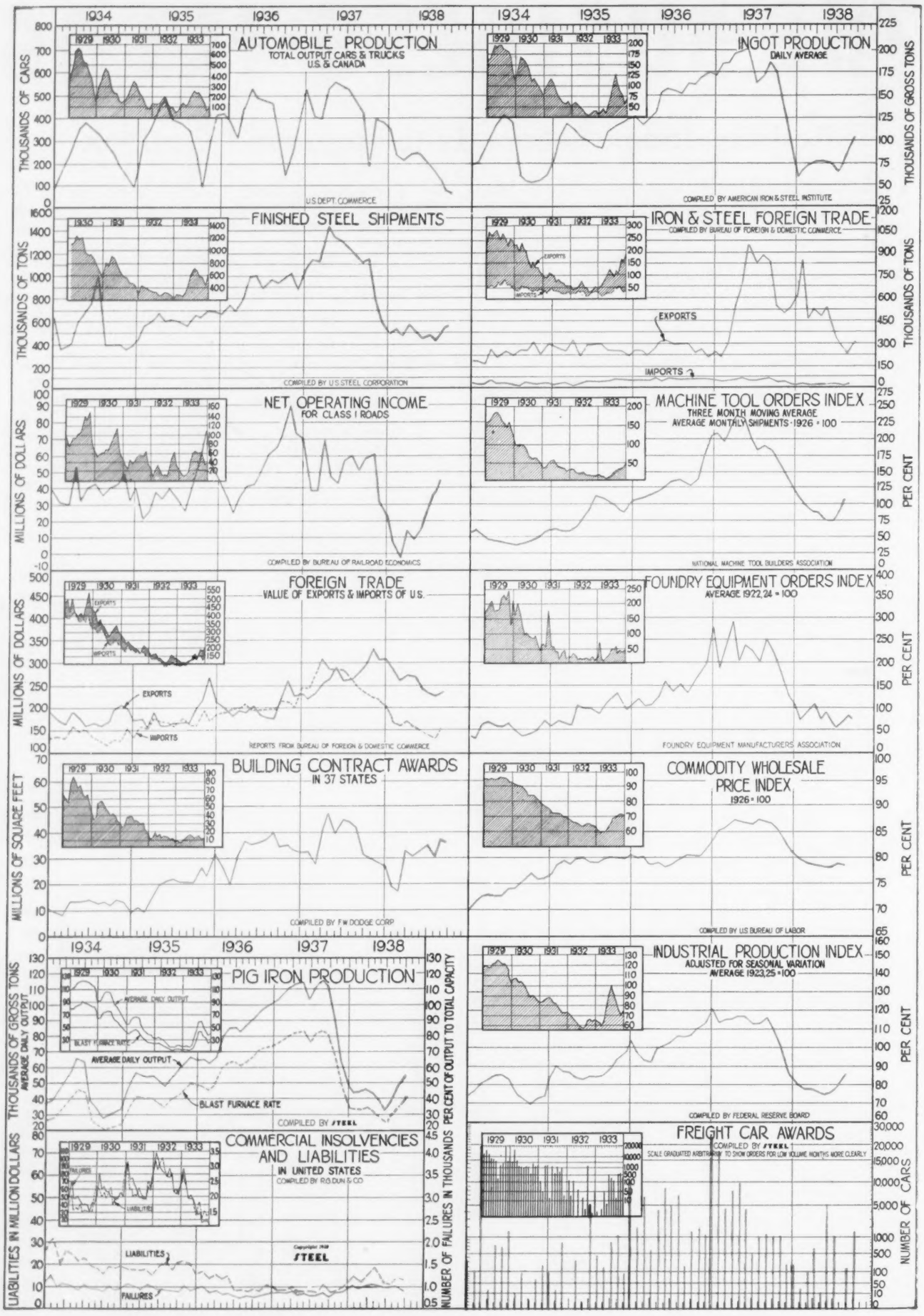
Early estimate of revenue freight carloadings for the week ended Oct. 22 indicate a slight decline to approximately 712,079 cars, from the peak this year of 726,612 in the preceding week. Barring Labor day week this represents the first week since Aug. 6 that carloadings failed to advance. Electric power consumption recorded the third consecutive weekly gain since the first of the month. Power output during the week ended Oct. 22 of



STEEL'S index of activity gained 4.5 points to 88.8 per cent in the week ended Oct. 22:

Week ending	1938	1937	1936	1935	1934	1933	1932	1931	1930	1929
July 16	69.9	115.7	99.9	79.8	67.8	79.1	46.9	70.0	79.1	115.5
July 23	68.7	108.0	102.1	80.8	68.1	79.4	51.5	69.7	78.7	120.8
July 30	69.0	109.1	102.5	78.4	66.4	78.8	46.1	68.9	79.2	117..
Aug. 6	66.9	107.3	98.7	73.4	64.6	75.9	45.1	67.0	85.6	117.2
Aug. 13	66.9	113.8	92.6	77.5	64.6	74.7	44.6	67.4	86.2	116.8
Aug. 20	70.5	110.3	97.7	77.0	61.4	74.2	44.9	67.3	88.5	116.4
Aug. 27	70.3	108.5	94.0	77.3	60.3	71.6	45.2	66.5	87.4	116.9
Sept. 3	72.3	104.8	87.5	70.9	55.1	70.3	45.4	65.3	79.0	106.3
Sept. 10	66.8	94.3	83.1	70.1	53.5	65.5	44.9	60.9	85.9	114.0
Sept. 17	72.9	95.0	90.1	69.4	58.7	69.1	47.8	65.6	86.2	112.2
Sept. 24	74.0	93.0	86.2	68.5	58.1	68.2	48.0	65.2	83.8	110.7
Oct. 1	74.9	96.6	89.0	73.3	59.3	66.9	47.7	62.4	81.0	109.1
Oct. 8	78.9	99.0	93.4	74.9	54.7	67.4	48.4	61.5	79.4	108.2
Oct. 15	84.3†	101.8	95.5	77.4	56.4	66.0	48.7	57.9	77.5	106.1
Oct. 22	88.8*	97.5	97.1	82.4	58.2	60.9	48.7	58.2	77.4	104.8

* Preliminary. † Revised.


AUTOMOBILE PRODUCTION
TOTAL OUTPUT CARS & TRUCKS U.S. & CANADA
U.S. DEPT. COMMERCE
THOUSANDS OF CARS
INGOT PRODUCTION
DAILY AVERAGE
COMPILED BY AMERICAN IRON & STEEL INSTITUTE
THOUSANDS OF GROSS TONS
FINISHED STEEL SHIPMENTS
COMPILED BY U.S. STEEL CORPORATION
THOUSANDS OF TONS
IRON & STEEL FOREIGN TRADE
COMPILED BY BUREAU OF FOREIGN & DOMESTIC COMMERCE
EXPORTS
IMPORTS
THOUSANDS OF TONS
NET OPERATING INCOME
FOR CLASS I ROADS
COMPILED BY BUREAU OF RAILROAD ECONOMICS
MILLIONS OF DOLLARS
MACHINE TOOL ORDERS INDEX
THREE MONTH MOVING AVERAGE
AVERAGE MONTHLY SHIPMENTS 1926 = 100
NATIONAL MACHINE TOOL BUILDERS ASSOCIATION
PER CENT
FOREIGN TRADE
VALUE OF EXPORTS & IMPORTS OF U.S.
EXPORTS
IMPORTS
REPORTS FROM BUREAU OF FOREIGN & DOMESTIC COMMERCE
MILLIONS OF DOLLARS
FOUNDRY EQUIPMENT ORDERS INDEX
AVERAGE 1922-24 = 100
FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION
PER CENT
BUILDING CONTRACT AWARDS
IN 37 STATES
COMPILED BY F.W. DODGE CORP.
MILLIONS OF SQUARE FEET
COMMODITY WHOLESALE PRICE INDEX
1926 = 100
COMPILED BY U.S. BUREAU OF LABOR
PER CENT
PIG IRON PRODUCTION
AVERAGE DAILY OUTPUT
BLAST FURNACE RATE
COMPILED BY STEEL
THOUSANDS OF GROSS TONS AVERAGE DAILY OUTPUT
PER CENT OF OUTPUT TO TOTAL CAPACITY
INDUSTRIAL PRODUCTION INDEX
ADJUSTED FOR SEASONAL VARIATION
AVERAGE 1923-25 = 100
COMPILED BY FEDERAL RESERVE BOARD
PER CENT
COMMERCIAL INSOLVENCIES AND LIABILITIES
IN UNITED STATES
COMPILED BY R.G. DUN & CO.
LIABILITIES
FAILURES
Copyright 1938 STEEL
LIABILITIES IN MILLION DOLLARS
NUMBER OF FAILURES IN THOUSANDS
FREIGHT CAR AWARDS
COMPILED BY STEEL
SCALE GRADUATED ARBITRARILY TO SHOW ORDERS FOR LOW VOLUME MONTHS MORE CLEARLY
NUMBER OF CARS

2,214.097,000 kilowatt-hours represents a substantial increase over the 2,182,751,000 kilowatt-hours in the previous week but failed to equal the peak this year recorded during the week ended Sept. 17. A year ago power consumption was placed at 2,281,636,000 kilowatt-hours.

Demand for machine tools and foundry equipment during September tapered off from the volume of the previous month. The monthly indexes were down slightly, but not enough to affect adversely the three months' average trend which continued to point upward. The three month moving average for machine tool orders during September advanced to 109.3 per cent from 93.6 per cent in August. While this represents the second consecutive monthly increase from the low this year of 75.2 per cent in July, it still remains substantially below the 187.2 per cent during September, 1937. The Foundry Equipment Manufacturers association's index of net orders during September stood at 78.7 per cent, against 83.3 in August and 231.8 per cent in September last year. The association reports that shipments eased off as did unfilled orders, the former standing at 84.2 against 89.1 a month earlier and the latter at 97.3 compared with 102.8 in August.

Construction contracts awarded during September, according to F. W. Dodge Corp., represented 37,528,000 square feet of new floor space with a valuation of $300,900,000. This represents a slight decline from the peak this year of 38,527,000 square feet during August valued at $313,141,000, but remains substantially above the 32,354,000 square feet with a valuation of $207,072,000 reported during September, 1937. However, in the first nine months this year construction contracts representing 284,734,000 square feet were considerably below the 357,762,000 square feet in the same period last year.

It is evident that recovery forces have gained considerable momentum during the past 30 days. Further progress is indicated, aided by the expected improvement in the building industry resulting from a rising residential demand and the anticipated substantial increase in automotive production through November and December. Likelihood of large government expenditures in the near future for armament purposes may also be an important factor in bolstering the recovery movement.

Where Business Stands

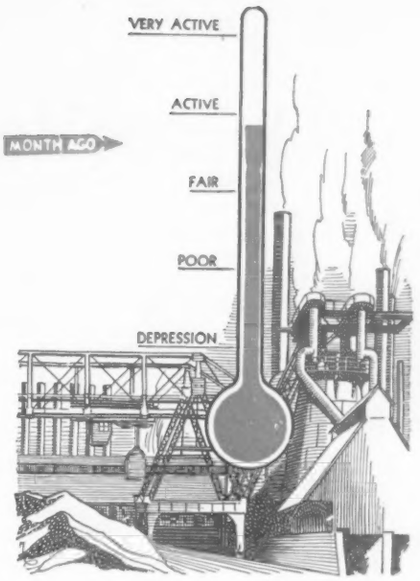
Monthly Averages, 1937 = 100

	Sept., 1938	Aug., 1938	Sept., 1937
Steel Ingot Output	61.1	59.1	107.5
Pig Iron Output	55.4	47.9	113.2
Freight Movement	89.5	83.8	109.6
Building Construction	100.4	103.0	86.6
Automobile Production	21.4	23.2	42.0
Wholesale Prices	90.7	90.5	101.3

Industrial Weather

TREND:

Upward



The Barometer of Business

Industrial Indicators

	Sept. 1938	Aug. 1938	Sept. 1937
Pig iron output (daily average, tons)	55,802	48,234	113,932
Machine tool index	109.3	93.6	187.2
Finished steel shipments	577,666	558,634	1,047,962
Ingot output (daily average, tons)	106,310	94,333	171,580
Dodge building awards in 37 states (sq. ft.)	37,528,000	38,527,000	32,364,300
Automobile output	89,623	96,936	175 630
Coal output, (tons)	32,010,000	28,710,000	39,177,000
Business failures; number	866	1,003	584
Business failures: liabilities	$14,341,000	$14,726,000	$ 9,818,000
Cement production, (bbls.)	10,562,000	11,007,000	11,223,000
Cotton consumption (bales)	534,037	561,406	601,305
Car loadings (weekly av.)	650,112	608,016	795,736

Foreign Trade

	Sept. 1938	Aug. 1938	Sept. 1937
Exports	$246,361,000	$230,621.000	$296,579,000
Imports	$167,651,000	$165,540,000	$233,361,000
Gold exports	$11,000	$16,958	$129.000
Gold imports	$520.907,000	$165,990,000	$145,623,000

Financial Indicators

	Sept. 1938	Aug. 1938	Sept. 1937
25 Industrial stocks	$170.67	$176.16	$197.79
25 Rail stocks	$19.38	$22.09	$33.35
40 Bonds	$68.60	$70.98	$80.84
Bank clear. (000 omitted)		$19,716,000	$24,076,000
Commercial paper rate New York (per cent)	¾	¾	1
* Comm. loans (000 omitted)	$8,241,000	$8,270,000	$10,004,000
Federal Reserve ratio, (per cent)	82.6	82.4	80.1
Railroad earnings	†$45,376,622	$38,387,209	$50,756,743
Stock sales, New York stock exchange	23,825,690	20,722,930	33,859,818
Bond sales (par value)	$134,244,900	$120,531,425	$181,250,400

* Leading member banks Federal Reserve System.
† August, July and August, respectively.

Commodity Prices

	Sept. 1938	Aug. 1938	Sept. 1937
STEEL's composite average of 25 iron and steel prices	$36.48	$36.50	$40.16
U. S. Bureau of Labor index	78.3	78.1	87.4
Wheat, cash (bushel)	$0.80	$0.79	$1.21
Corn, cash (bushel)	$0.67	$0.68	$1.20

Controlled Grain Size

Small user of steel now obtains the many advantages of controlled grain size stock through the services available from the modern steel warehouse

■ ONE OF the comparatively recent developments in types of steel stocked in steel warehouses is the element of controlled grain size. As a result of the great interest and development work done in connection with the establishment of the McQuaid-Ehn tests for grain size, Crucible Steel Co. of America decided in 1934 to introduce a stock of controlled grain size steel in its Cleveland warehouse at 1258 East Fifty-fifth street.

Started as an experiment, the innovation has elicited such widely growing interest that today shipments from Cleveland to such outlying points as Texas, St. Louis and New England territory are not unusual and the company has found it necessary to increase the amount, number of types and sizes stocked, adding stocks at other points throughout the country.

Development of grain size determinations and their significance are interesting. Until 1922, there were only two generally recognized criteria for the grading of alloy steels. Chemical composition and method of manufacture, that is acid or basic open hearth, electric, crucible, etc.

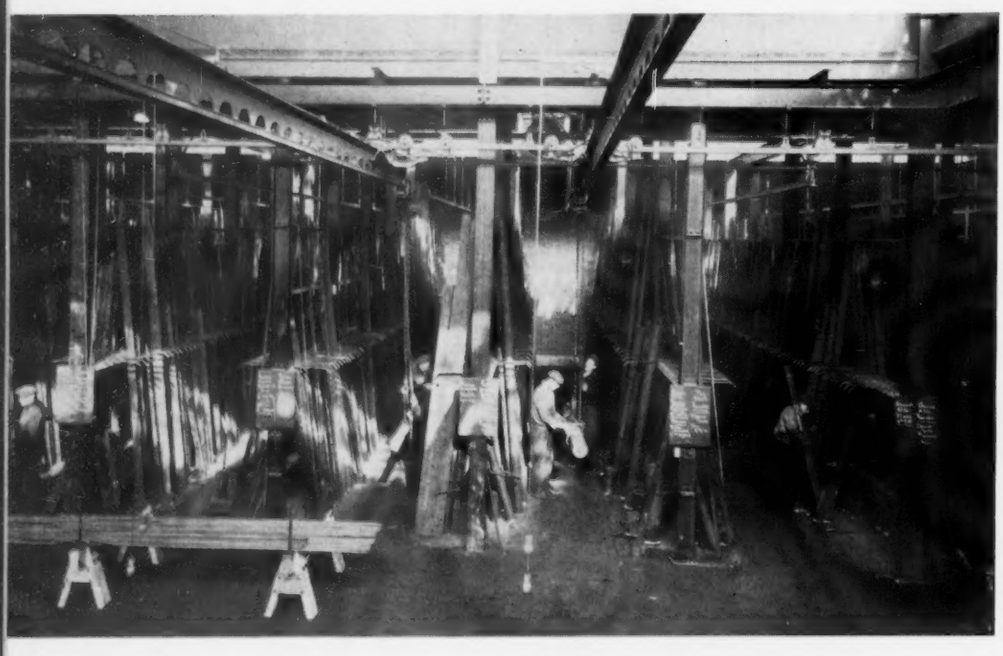
However, it was soon evident that two heats of steel made by the same process and of exactly the same chemical analysis could react quite differently as respects response to heat treatment and as to physical and mechanical properties procurable. Attempts to evaluate these quality factors proved to be far less tangible than the mathematically positive chemical analysis.

As knowledge of steel metallurgy advanced, it became apparent that the cleanliness of the steel and its inherent grain size were possibly two of the most important factors governing the behavior of different heats of steel of the same analysis. Both of these factors are controllable if the maker is sufficiently skillful and is willing to devote to his product the extra care and expense which are necessary.

Controlled grain size becomes of great significance in making screw machine products which subsequently are heat-treated to produce certain physical characteristics in the metal. Ordinary stock used for this work may have widely varying grain sizes. Since grain size has a potent effect on behavior of steel in heat treatment, widely varying grain size is likely to cause serious variations in the work produced. Thus use of controlled grain size steels appears particularly valuable in connection with screw machines and similar automatic machines using cold-drawn steel, as well as for parts such as special gears, heat-treated boiler bolts and studs for high-pressure service, machine parts, etc., many of which are made of hot-rolled steel.

Both coarse grained and fine grained steels have their advantages, depending upon the particular application. Generally speaking, however, the fine grained steels are safer to handle. Coarse grained steels are deeper hardening but the hardening range is quite narrow and the toughness and ductility factors are adversely influenced.

On the other hand, fine grained steels appear less sensitive to variations in quenching temperatures. Also there is less possibility of injury during heat treatment. In addition they provide maximum duc-



View in Cleveland warehouse of Crucible Steel Co. of America showing part of the 1000-ton stock of steel maintained here. Note abscence of horizontal racks as steel is stored on end. Traveling monorial bridges interlock with sections in each aisle

tility and resistance to impact. Too, the depth hardening factor can be controlled easily by proper choice of alloy content.

All these factors mean that use of controlled grain size steels simply eliminates another factor which has been the source of serious variations and the cause of a high percentage of rejects on certain operations. The ease with which uniform results from heat treating are obtained is very satisfying. Unless controlled grain size steels are employed, it often is necessary to readjust the heat-treating procedure, and in particular the quenching temperature and tempering heat, to conform to the characteristics of each batch. Even then it is unlikely that the best combination of strength, hardness, ductility and toughness will always be achieved.

To indicate the seriousness of this problem, recently a manufacturer of automotive parts found his rejects running as much as 11 per cent, an abnormally high figure for his type of work. Careful investigation disclosed the cause of variations obtained in the physical characteristics after heat treating was due to variations in grain size in the work.

Accordingly each lot is now checked for grain size prior to heat treating. Material is grouped into one of three classifications according to grain size. Each group then receives a heat-treating procedure adjusted to give the desired physical characteristics in material of that particular grain size. The result has been to reduce rejects to between one and two per cent, a low figure for this type of work.

Since it is not practicable to carry a number of grain sizes in stock in various analyses, sizes and shapes, and since the principal benefits of grain-size control can be obtained using a single grain size range, Crucible Steel Co. of America standardized on the range of grain size between six and eight on the McQuaid-Ehn scale. Controlled grain size stock is guaranteed to be within this range.

Machines Well

These particular values were chosen because they assure relatively fine-grained steel little affected by slight variations in heat treating temperatures and so producing uniform results. Also this grain size is large enough to give fairly good machining characteristics and thus efficient operation with screw machines and similar equipment.

At the present time, Crucible lists hot-rolled open-hearth SAE 2315-2320 steel in round bars from ½ to 6 inches in diameter in stock in Cleveland, also cold-drawn rounds for 7/16 to 2½ inches in diameter. Other analyses include the 3½ per cent nickel steel SAE 2330-2335, nickel chromium SAE 3120, SAE 3130-3135, SAE 3140, SAE 3250, as well as SAE 4140 and SAE 4615 and 52,100. It will be seen the carbon content ranges from 0.15 to 0.50 per cent, the lower percentages usually being employed for steels subsequently case hardened and the higher carbons being oil quenched.

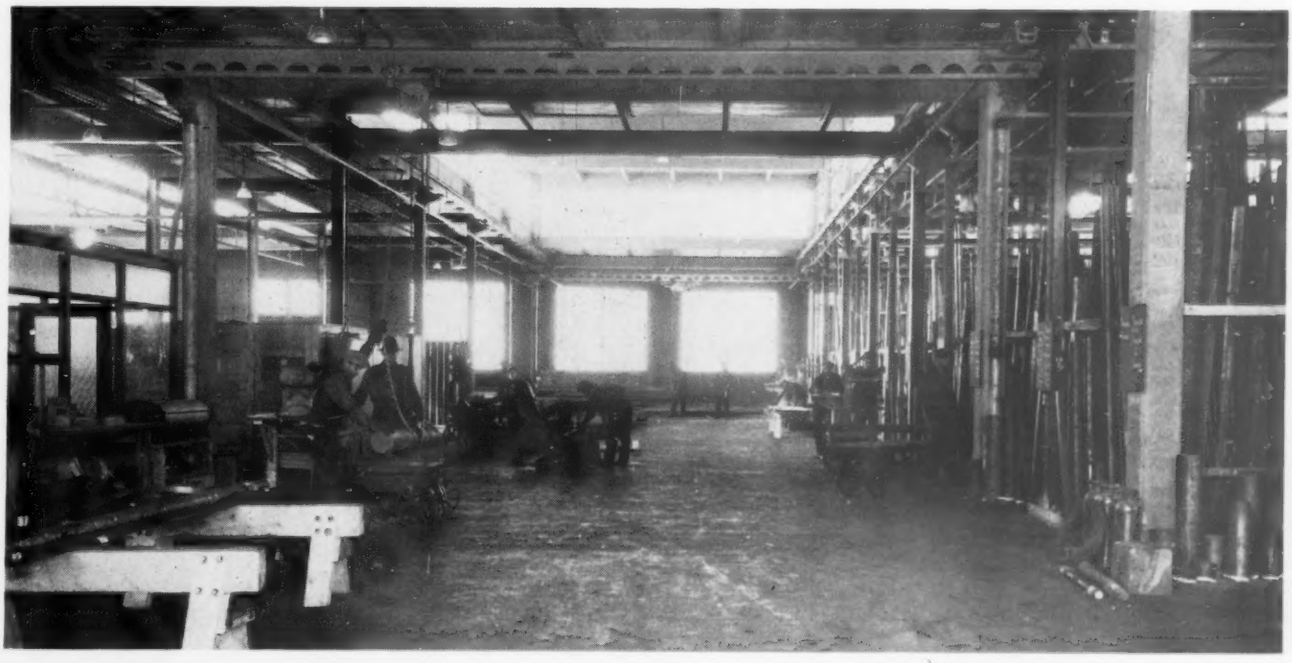
Most of the material stocked is in the form of round bars although a few hexagonal bars are warehoused. Each piece of bar stock carries a heat number which serves to identify the particular heat from which that piece of material came. Since the exact chemical analysis and grain size have been determined at the mill for each heat, it is a simple matter to furnish the user with this actual data on any particular piece of material he may purchase.

The Cleveland warehouse of Crucible Steel Co. of America is believed to be the first in which a stock of controlled grain size steels was maintained. Many calls from Buffalo territory soon made it desirable to stock certain sizes there. Said to be the only steel manufacturer to have its own warehousing and distributing system, large stocks of various alloy and carbon tool steel, drill rod material, corrosion and heat-resisting steels, machine and spring steels and other alloy steels are maintained by the company at more than 20 strategic points scattered over the country to give national coverage.

The demand for controlled grain size steels now has increased to a point where the company has decided to stock these steels at Chicago, Cincinnati, Indianapolis and Harrison, N. J., in addition to Cleveland and Buffalo.

Cleveland stock includes about 1000 tons of various items shown in accompanying illustrations. A rather unusual method of storing is employed here. As will be noted by studying these views, stock is placed on end in storage, rather than horizontally in racks. This method has been found very flexible as large quantities are easily stored. Also handling in and out of stock is made easier. A monorail section is permanently mounted in each aisle

(*Please turn to Page* 64)

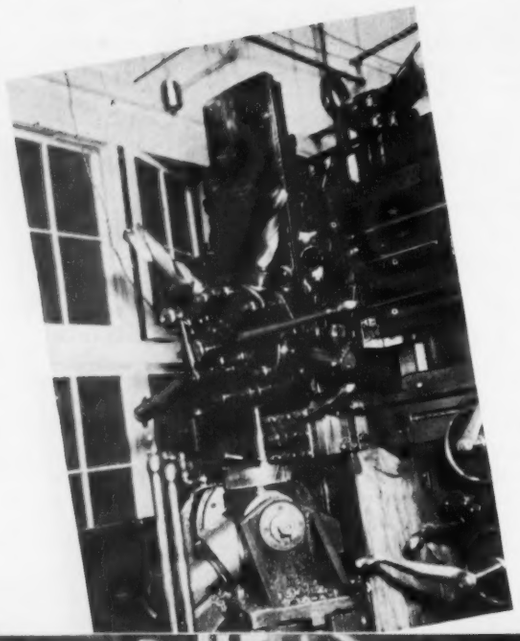


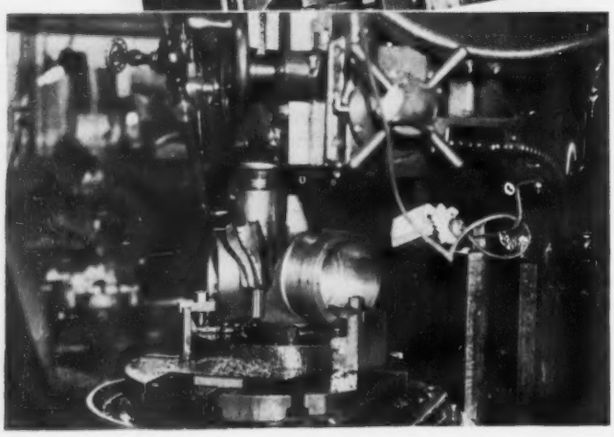
In this part of the Cleveland warehouse, the material is cut to length, several types of saws being employed for this purpose

PRECISI
in A

Machining parts to closer tolerances meets increasing demand for better and more dependable engine performance in aviation

By FRED B. JACOBS

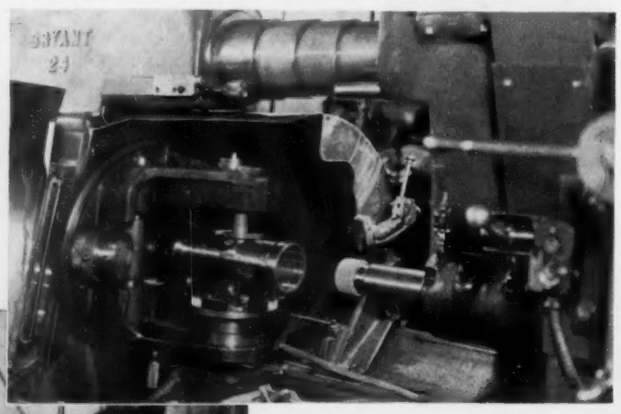




At upper left a vertical mill is seen boring three holes in propeller hub for blades. Note special indexing fixture

In operation at left spaces between propeller hub projections are form milled. Work is fed toward cutter to correct depth, then rotated 60 degrees

In operation shown below a 2-blade propeller hub is located for grinding internally the holes which accommodate blades. Special fixture locates work



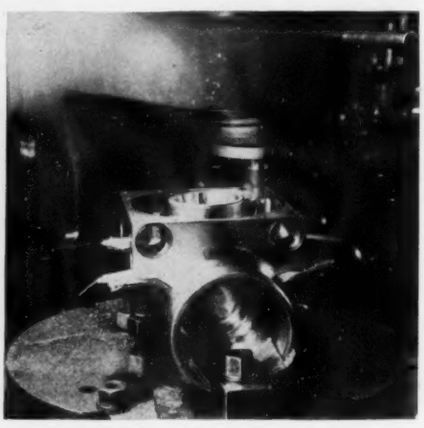
In operation below machinist is finishing counterbored surface in a propeller hub. Work is located on a special arbor and is mounted in an 18-inch lathe

Vertical machine at right is making a milling cut for clearance in a 2-blade propeller hub. Work is strapped to rotary platen

■ THERE is no room for machining errors in the manufacture of aircraft engines. Slight defects in a finished power unit may easily bring disaster to occupants of an airplane in which such an engine is used. Recognizing this obvious fact, Aviation Mfg. Corp., Lycoming division, Williamsport, Pa., has developed a high standard of precision in its shop equipment and in the skill of machinists who operate the tools.

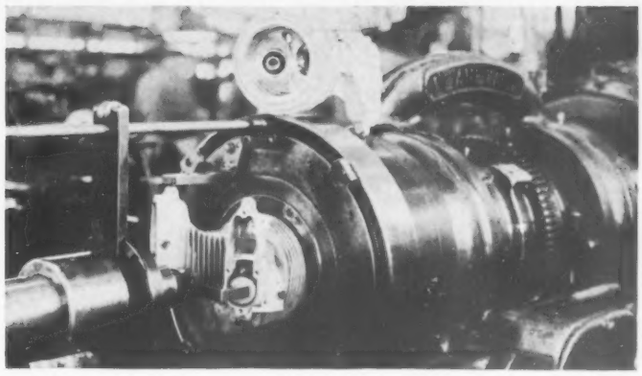
Forming of parts for aircraft engines involves work of a very exacting nature. Under ordinary conditions it does not represent repetition production on an extensive scale. Special tooling necessarily must be employed, and tools must be operated by men with inherent mechanical intuition.

Accompanying illustrations por-

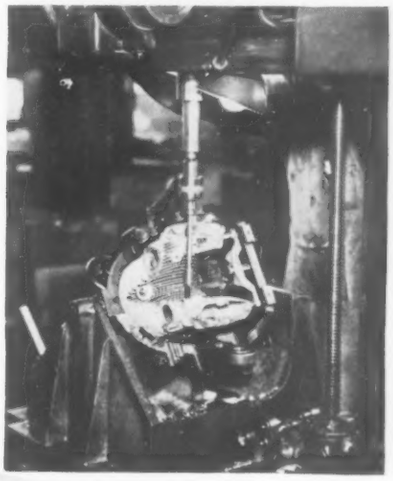


SION

Aircraft Engines



Above is shown a machine arranged for milling a 12-pitch thread on the inside of a cylinder head

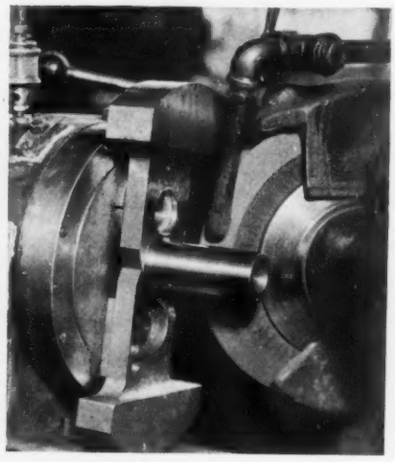


At right is shown work-locating fixture for holding cylinder heads for drilling, tapping and counterboring operations. With this indexing type fixture necessary angles for locating work are determined accurately and quickly

tray typical machine setups at the plant of Aviation Mfg. Co. It will be noted that in the design of these special tools, much attention has been given to providing fixtures which will hold parts in exact positions during full machining cycle. Precision thus is not limited to functions of the actual tools, but is maintained in the relation of work to machine. Tolerances required in aircraft engines are too close to permit extensive manual indexing of parts during machine operations.

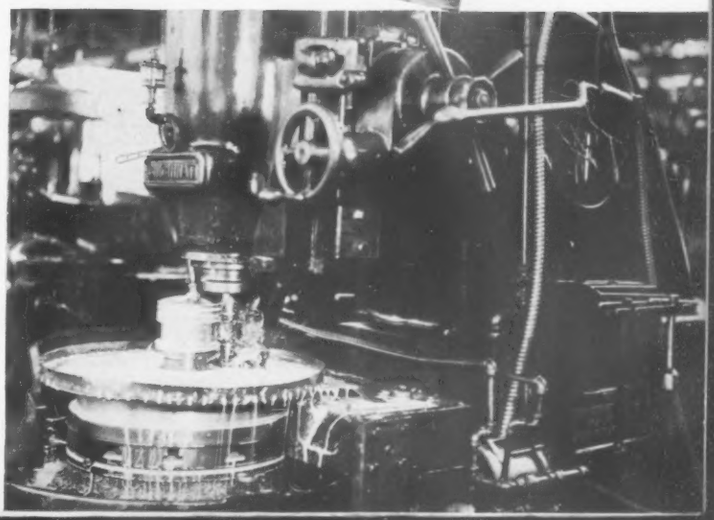
Dependability of power units recently introduced for airplanes may be credited not only to improved engine design but also to new and ingenious machine applications which have made possible production of parts characterized by high precision.

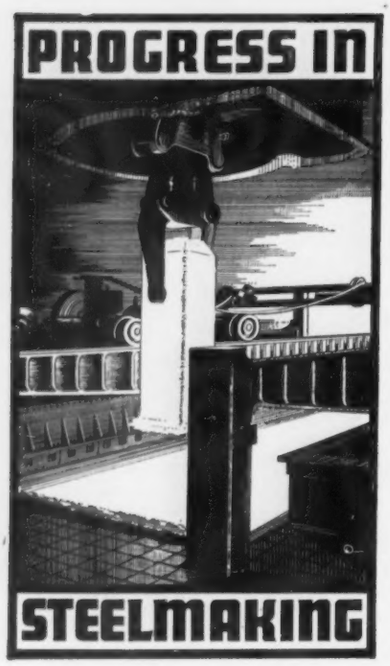
Crankpin is being finished on grinder shown below. Note counter-weight which keeps work from rotating out of balance



Machine shown above is used to grind lobes on cam which regulates exhaust and intake. Lobes must conform closely to specifications

Vertical miller at right is used for machining relieved portions on aluminum alloy pistons. Work is revolved by a rotary platen





Heat Transfer

Definitely limiting rate of heat input to an electric arc melting furnace here shows increased efficiency and economy. Curves compare results of 377 heats

By C. H. VOM BAUR

■FOR YEARS the theory has been advanced that melting would take place instantly if an infinite amount of heat were concentrated in the metal to be melted and radiating losses disregarded. The fact is that transmission of heat through the metal itself would not be sufficiently rapid to cause instantaneous melting.

The practical application of this is seen in electric arc furnaces where greater economy can be shown to result when rate of heat input is held below certain limits. The factor involved is that heating or melting of the metal is limited by efficiency of the transfer of heat through it, and application of heat at rates above this value adds to the losses thus reducing efficiency of the melting operation. The object, of course, in controlling melting in any particular furnace with its many operating variables is to find out what rate of heat input is accompanied by highest melting efficiency.

This point received careful consideration in connection with a two to three-ton Heroult furnace operating at 110 volts per phase. Inherent reactance was between 10 and 12 per cent. No choke coil was used. The transformer was rated 1200 kilovolt-amperes.

This furnace was used in making acid steel for casting, using steel scrap which varied in size from heads weighing over 500 pounds each to small punchings averaging as high as 500 to the pound.

Two methods of charging were employed. In the first, small pieces were placed on the bottom, middle sized pieces near the center and large pieces on top. This gave a rather low efficiency. In the second method, large pieces were placed on the bottom, middle sized pieces near the center with small pieces on top giving a higher efficiency. These two methods alone brought about considerable variation.

For over a decade this electric melting and refining furnace was operated with all the power available during the melting, the needles of the indicating instrument shivering against the upper stops until the demand meter curtailed this inrush of power near the end of each 15-minute period. In an effort to curtail demand, a maximum demand meter with a bell attachment was installed but did not accomplish any noticeable degree of economy.

In an effort to raise the efficiency of operations, several test runs were made. From other experiences it was advanced that less instantaneous power applied during the melting period might produce better results. This was applicable either for heats where the steel produced was

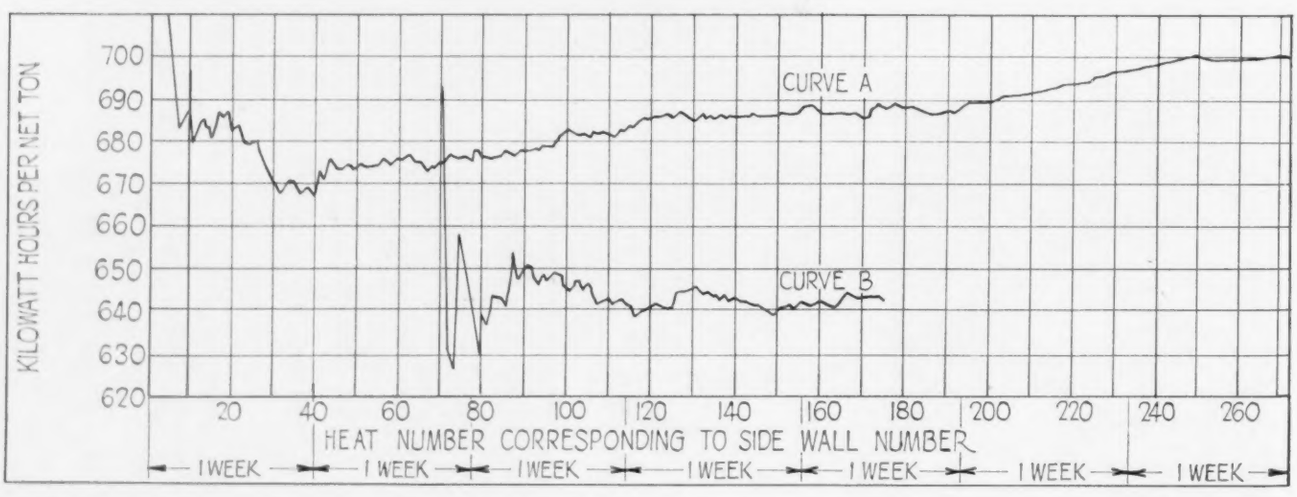


Fig. 1—Furnace power consumption before (A) and after (B) conditions were changed

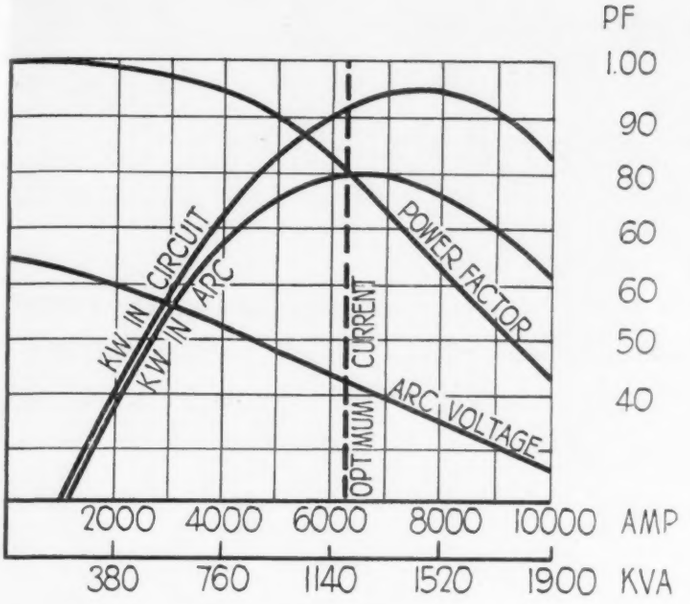


Fig. 2—Working conditions with 3-ton furnace. Voltage 110 per phase. No choke coil

for larger pieces, hence not so hot, and poured directly from a bottom pour ladle to the molds, or where the metal was for very small castings which required repouring from a teapot to bull ladles and then to molds. The jumps of curves A and B, Fig. 1, are due to from one to three successive teapot heats.

Curve A, Fig. 1, is a record of a campaign of seven weeks, the latter three of which were most unfortunate as indicated by the high power consumption for those three weeks. The side walls, for all economical purposes, were worn out after the first four weeks of operation. However, no bricks were available for repair for another three weeks.

Power Consumption Deceptive

The slowly changing curve A with its gradual rise in kilowatt hours per ton for successful heats is at first deceptive. The average for the entire 272 heats shown in this curve amounted to 701.1 kilowatt hours per net ton. Due to the more economical conditions during the first four weeks it is not at first evident that last two weeks average was 720 kilowatt hours per net ton.

The thinning and uninsulated walls became a major factor with time. Records were being kept and many trial heats were made with reductions in power during the melting. Changes were made in charging and melting practice. Finally electrodes were changed to graphite and the furnace was ready for the next campaign with new and insulated side walls, etc.

Although difficult to evaluate effects of each variable acting, the main economy in the following campaign was due to the positive power limitation to the furnace as evidenced by curve B, Fig. 1.

This was accomplished by mechanical stops which limited the useable range of the three heat regulating rheostats to only three-quarters of their possible range. Thus maximum power of the circuit was no longer attainable, and the instrument needles no longer shivered against the upper stops. Power was reduced about 400 kilovolt amperes, that portion between 1520 and 1900 kilovolt amperes in Fig. 2 being eliminated.

This raised the arc voltage from a point where one electrode often was dipping in the bath to where the arc at least was visible. The power factor was raised and also the actual kilowatts in the arc. All this was accompanied by a reduction of kilowatts in the circuit.

Approaching the curve from the other end as maximum power in the arc is neared, the gain in heat input in the furnace by increasing the current becomes less and less. This curve, Fig. 2, shows that by increasing the current from 5000 to 6220 amperes, an increase of 24 per cent results only in a 4 per cent increase in actual power input to the furnace. To gain this small amount the electrical efficiency is lowered some 3 per cent and the power factor about 9 per cent.

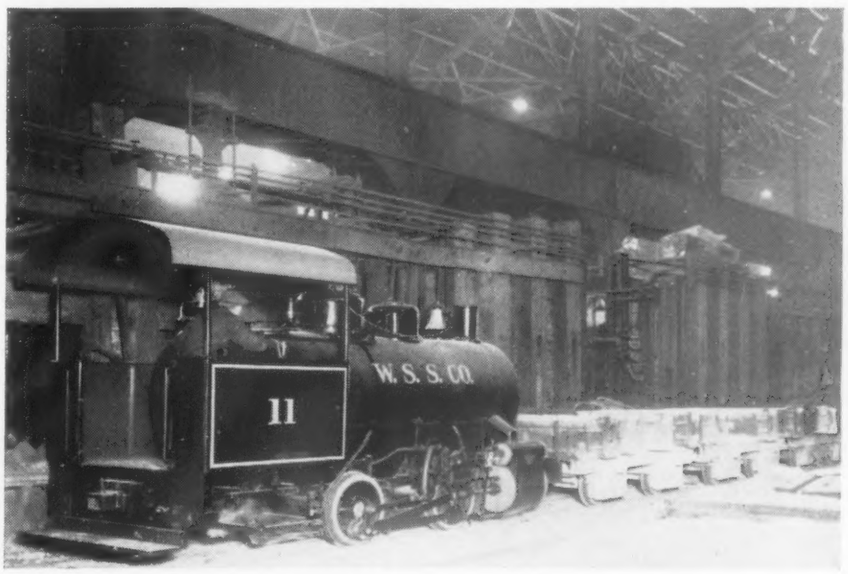
Shows Power Waste

Also it shows that operating the furnace between 8000 and 10,000 amperes is a decided waste of power. In fact there is more effective heat; that is, cheaper more economical heat available at 5000 to 6220 amperes than when operating between 8000 and 10,000 amperes. By staying in the neighborhood of 360 kilowatts per ton charged during the melting period, the best results were obtained. This was equivalent to 945 kilowatts in the circuit as the average charge was 2.62 net tons. Curve B, Fig. 1, records the increased efficiency obtained during the second campaign when the power was curtailed as described.

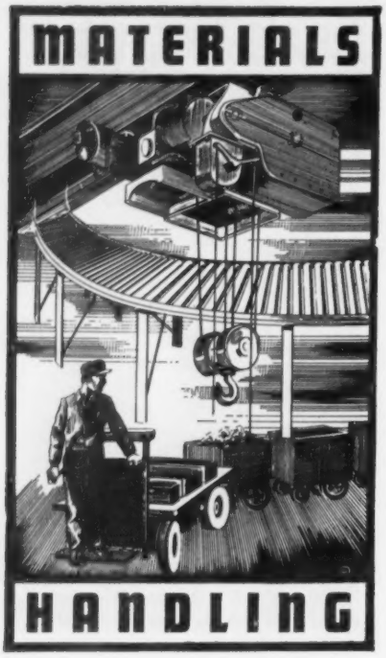
Reverting to the detail of curve A, Fig. 1, the last three weeks took

(*Please turn to Page* 62)

Charges Openhearth Furnaces



■ **This small 15-ton fireless locomotive was built recently by Heisler Locomotive Works, Erie, Pa., for Wickwire Spencer Steel Co., Buffalo. As shown above, engine serves the charging side of openhearth furnaces**



Dishwashers

Double line of roller conveyors with turntables and crossovers provides maximum flexibility in assembling, testing and finishing operations. Special transformer setup used

■ MODERN commercial dishwashing equipment is only one type of many kitchen machines made by Hobart Mfg. Co., Troy, O. Its plant No. 2 is devoted entirely to dishwasher manufacture.

One of the problems involved in this plant was to work out an efficient materials handling system to take care of the extremely wide variation in style, design and modifications of these dishwashers which are built in 13 standard types and sizes with almost infinite variation in arrangement of doors, pumps, motors, drives, mountings and auxiliary equipment.

The tanks and wash chambers are of copper, galvanized iron, monel or stainless steel sheets. Galvanized sheet was originally used on practically all models but now takes a smaller place in production due to the increased demand for monel and stainless steel.

Dishwashers vary in size. Small units are about 21 inches long and 22 inches wide at table height and use a ¼-horsepower motor to pump 40 gallons per minute of water to the sprays and rinses. Large specially designed dishwashers may have table dimensions 36 inches wide by 100 inches long and employ several pumps and two motors. Small washers are of the semi-automatic rack type while the large washers use a Dual-Drive conveyor to carry the racks through the machine continuously.

The materials handling system now employed is rather unusual. The various parts for washers such as pumps, motors, valves, tanks, chambers, sprays, etc., are fabricated in other departments of the plant and stocked in a storeroom extending along one side and down the entire length of the assembly department. Stockroom is separated from assembly lines by skeleton steel network panels with doors at frequent intervals.

Long Conveyor Used

There are more than 700 feet of roller conveyor extending in two continuous lines down the length of the assembly department as shown in Fig. 1. One conveyor line is along the windows, another conveyor line is along the stockroom. Between these are numerous interconnecting transfer lines. The two main lines are supplied with turntables spaced a short distance apart

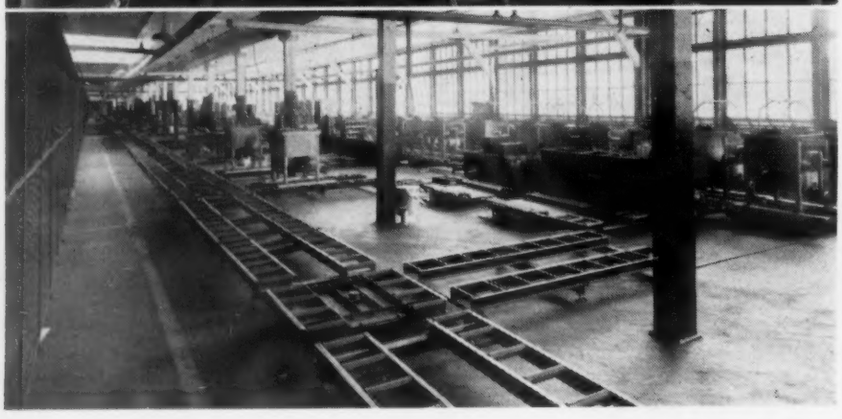


Fig. 1. (Top)—Assembling dishwashers of various sizes and types. Fig. 2. (Below)—View showing layout of roller conveyors and crossovers with turntables

UPSA-DAISY!

"Come on up here," says the crane to the fork truck. "I'll show you a place where you're needed." And up goes this baby giant—ever eager to keep production moving! Plant-profits protection powers possessed by storage battery industrial trucks of all types make them "on demand" every minute of the working hour.

FEW TOOLS of industry pay for themselves as quickly as do these trucks and their countless brothers and cousins on the payrolls of steel and steel fabricating plants, both large and small, everywhere. They make tough handling jobs easy, dangerous handling jobs safe. Battery powered trucks are safe themselves and quiet too. They accelerate smoothly, create no fire hazards, no smoke, no poisonous fumes.

Powered by steel storage batteries, these trucks can be depended upon to cut down, often entirely eliminate waiting. They'll ease congestion, make possible the full time utilization of costly machinery and other plant facilities. Steel storage batteries are dependable power sources. They are fool-proof electrically, physically tough, tireless. Edison District Sales Offices stand ready and willing to demonstrate, with sound motion pictures, modern handling methods. Make an appointment today for a showing at your convenience—in your office or at theirs.

EDISON **STORAGE BATTERY**

Medallic Art Co.

DIVISION OF THOMAS A. EDISON, INC. WEST ORANGE, NEW JERSEY, U.S.A.

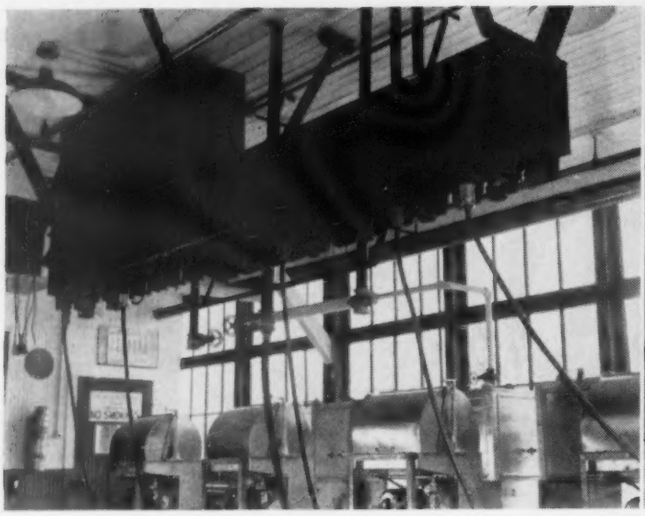


Fig. 3—Multiple plug-in board furnishes access to standard test voltages

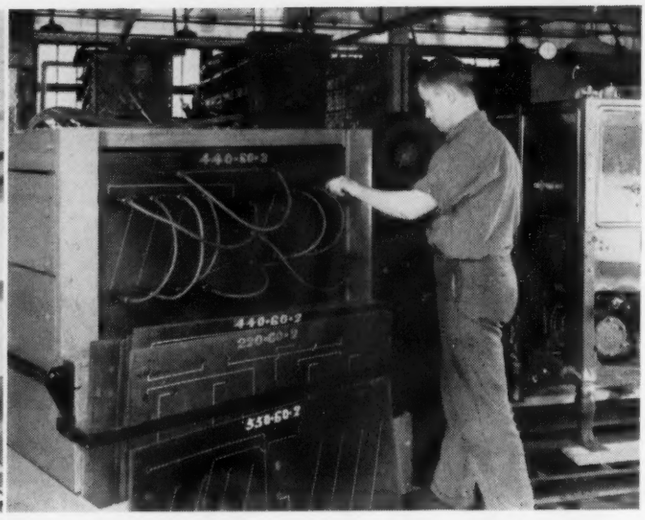


Fig. 4—Special setup uses two transformers and connection board to furnish unusual test voltages

over which partially assembled machines are easily transferred to work stations between the two lines seen in Fig. 1.

This provides a most flexible arrangement and makes possible simultaneous assembly operations on many different types of washers. Work is not confined to a single path down the assembly line. Thus a machine which involves more complicated assembly and a longer time will not hold up work on more simple assemblies.

Parts from the stockroom at left in Fig. 1 are taken to the assembly line and mounted. Foreground in Fig. 1 shows start of assembly process, machine proceeding down the department towards the background in this illustration. Fig. 2 taken from same end of this department provides an excellent view of the two lines of roller conveyors, the turntables, cross conveyors and work stations.

As the machines are brought down the conveyor completely assembled, they are moved on to the test floor where a unique setup is utilized in checking the electrical equipment. These dishwashing machines are built for use in many foreign countries as well as for domestic use and so motors are supplied for a wide variety of electrical services. This means that in giving each washer an operating test all of these electrical services must be available in the test floor.

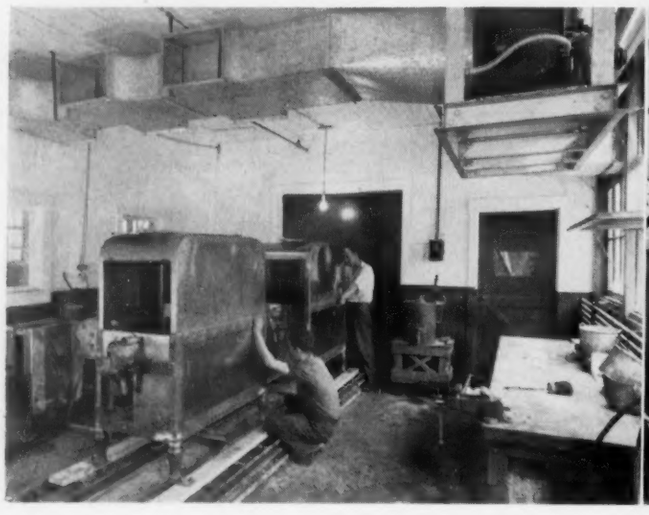
Fig. 3 shows set of cords and plug connections used in checking 110 and 220-volt, 60-cycle, single and three-phase motors as well as 110, 220 and 440-volt, direct-current machines. This handles the larger proportion of the machines. As some of the larger equipment employs two motors a number of sockets are available for each set of services.

Fig. 4 shows an unusual test set especially developed to handle odd combinations of alternating current services. This test set is mounted on casters so it can be moved freely about the department. It contains two transformers using multiple tapped windings to provide for unusual combinations.

As seen in Fig. 4, a complicated plug-type switchboard is utilized. A scheme has been worked out which greatly simplifies making connections. A series of fiber panels serves as a guide in making connections. Each panel is for a specified set of service combinations. Those seen in the illustration include a 550-volt, 60-cycle, two-phase panel setting on the floor and two labeled 220-volt, 60-cycle, two-phase and 440-volt, 60-cycle, two-phase seen in the front pocket of the machine. The panel used in making connections

(*Please turn to Page* 63)

Fig. 5—Cleaning and polishing room through which machines pass during finishing



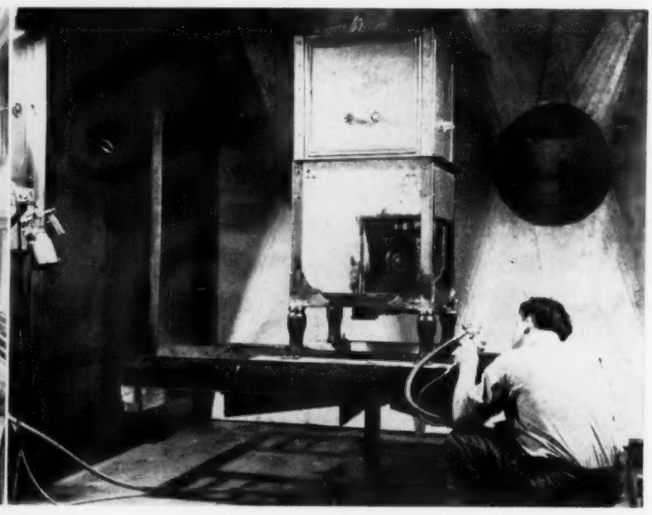


Fig. 6—Spray booth employs conveyor section mounted on lift, raising machines to a convenient working height

Explains Processing of Stainless Steel Wire

■ FIRST demand for stainless steel in wire form came from the necessity of having for welding rods, bolts, nuts, screws, rivets and nails, material of similar composition to the stainless plates, sheets, and bars used in fabricating various types of equipment. Experience indicates that these items should be made from wire of approximately the same analysis as the material to be fabricated.

Some of the factors involved in the selection of the types of stainless that will best meet the requirements of the application, and a discussion of methods of processing some of these wires were presented by J. K. Findley, metallurgist, Allegheny-Ludlum Steel Corp., Dunkirk, N. Y., before a session of the annual meeting of the Wire association in Detroit, Oct. 17-20, during the twentieth annual National Metal congress. A report of early sessions of the meeting appeared in STEEL for Oct. 24, pages 17 and 45.

Lower Carbide Precipitation

Referring to the austenitic chrome-nickel type of welding rod, Mr. Findley stated that titanium or columbium may be included in the analysis because these elements prevent excessive carbide precipitation. Neither the low carbon straight chromium nor the austenitic chrome-nickel wire has given great difficulty in cold heading operations.

Most of the heading of stainless steel wire is accomplished in closed dies; the wire, therefore, is supplied with a lubricating coating drawn onto the wire. He explained, however, that copper lime and soap, or an oxidized coating may be used.

The speaker pointed out that as a conservative estimate at least one-half of the stainless wire now produced in sizes under 3/32-inch round is used in weaving wire cloth, screens, and conveyor belts. Wire cloth used in paper mill equipment accounts for a large part of this quantity.

In discussing spring wire, Mr. Findley recommended 350 degrees Fahr. as the maximum operating temperature for springs made from 18-8 chrome-nickel steel. He stated, however, that many of these springs are operated at temperatures far higher than this and maintain fair spring properties. For most uses it is recommended that these springs be baked at a temperature of 400 to 600 degrees Fahr. after coiling to get permanent set or dimensions.

The amount stainless rods can be cold drawn before an anneal depends to a large extent upon the type of drawing equipment available, the speaker contended. The stiffness imparted by work-hardening makes it economical in a number of cases to anneal after about a 65 per cent reduction of cross sectional area. Mr. Findley directed attention to the fact that the processing annealing temperatures often are 100 to 200 degrees Fahr. lower than the first anneal, if the material is to have a subsequent full anneal.

The speaker announced that continuous strand annealing under pure hydrogen atmosphere is becoming more prevalent on the intermediate anneals as well as on the final anneals. It is a distinct advantage, he stated, to process anneal as well as final anneal all sizes under approximately 0.100-inch round in strand annealing furnaces.

Slip-ring type multiple drawing machines are used with success in drawing sizes approximately 1/16-inch round and smaller. Speed of drawing may vary from 100 to 200 feet a minute, depending entirely upon the type of finish or temper to which the wire is being drawn. On finer sizes, the speaker recommended speeds of 300 to 500 feet per minute.

Discussion brought out the fact that white lead is employed as a lubricant in the cold heading of stainless steel and soluble oil and water when drawing small stainless wire. When the product is drawn through tungsten dies either an oxide or lead coating is employed.

W. R. Bloxdorf, metallurgist, Macwhyte Co., Kenosha, Wis., and this year's metalist of the Wire association, in speaking on "Wire Rope" pointed out that all wire from the smallest to that having a diameter of about 14-gage usually is made from a No. 5 gage hot rolled wire rod. He cautioned that a limited number of larger sizes can be made from a No. 5 rod but to do so does not represent the best practice. He recommended a heavier wire rod for the larger sizes.

Recommends Patenting

The speaker favored preliminary patenting of wire rods intended for rope wire. He emphasized for the sake of uniformity and quality in the finished wire that patenting should be applied to all wire rods whose carbon content exceeds 0.55 per cent. In the case of rods having a carbon content of 0.25 to 0.50 per cent, preliminary patenting is not entirely necessary provided the total amount of cold drawing which the hot rolled rod is to receive is not excessive. However, he contended, patenting of these lower carbon rods certainly does no harm.

The physical properties imparted to rope wire or wire rod through the patenting treatment are de-

(*Please turn to Page* 62)

■ **Louis Johnson, assistant secretary of war, Washington, addressed the Wire association on "Industrial Mobilization," STEEL, Oct. 24, page 17. Hosts to the speaker were officers and members of the association, left to right; Vice President J. C. Callaghan, works manager, Canadian works, Steel Co. of Canada, Hamilton, Ont.; Sidney Rolle, assistant manager, U. S. Metals Refining Co., New York; President F. A. Westphal, superintendent of wire mills, Sheffield Steel Corp., Kansas City, Mo.; Director W. H. Bassett Jr., manager, metallurgical department, Anaconda Wire & Cable Co., Hastings-on-Hudson, N. Y.; Mr. Johnson; Vice President E. W. Clark, mechanical engineer, wire and cable department, General Electric Co., Schenectady, N. Y.; K. R. Beardslee, general sales manager, Carboloy Co. Inc., Detroit; and Secretary R. E. Brown, NewYork**

Molding Fasteners

Many unique devices developed for automotive applications, find wide acceptance in other industries. Speed joining of moldings, trim, etc. to various types of structures

■ DEVELOPMENT of automotive design and manufacture has been accompanied by introduction of several unique types of fasteners. United Carr Fastener Corp., Cambridge, Mass., furnishes a large number of special shaped fasteners to automobile manufacturers for use in attaching molding strip quickly and economically on radiator shells, cowls, running boards, trunk racks and tire covers. Also many special purpose fasteners have been developed for use in mounting door and side panels, center strip, upholstery and window channels. Other industries too are finding these items helpful in reducing assembly and fabricating costs. A number of radio cabinets, therapeutic and dental machine cabinets and similar products are now being built employing these fasteners to mount molding strips, trim and similar parts.

While these fasteners are used on a wide variety of equipment, probably the largest proportion are used to fasten molding in place. They are equally well suited to a wide variety of molding cross sections, including those shown in Fig. 1, which range from rectangular through oval and up to a triangular cross section.

Figs. 2, 3 and 4 illustrate three types of molding fasteners. Fig. 2 is used to hold ⅜-inch molding against 0.043-inch sheet material. This is the removable insert type and is most universally adaptable for semi-permanent assemblies. This, like practically all other types of these fasteners, is made of spring steel with a corrosion resistant finish. It will not loosen under vibration or jarring, it is claimed. It is suitable for open-channel moldings of all types.

It is quickly applied by the three steps in Fig. 5. Top part of Fig. 5 shows how prongs of fasteners are inserted through a round or elongated hole in the supporting structure. The center view of Fig. 5 shows the second step. Here the molding is placed over the prongs with prongs being held parallel to molding channel as illustrated. This permits prongs to pass through the open side of the channel. Lower view of Fig. 5 shows how fastener is secured in position. Screw driver inserted in a slot in the back of the fastener is employed to twist the fastener a half turn. This engages the prongs with both sides of the channel in a tight rigid grip that does not loosen. As the fastener is made of spring steel, tension is maintained permanently so the assembly will not become loose or insecure even under continual vibration. This is simpler than strip assembly and is less costly.

Fig. 3 shows removable snap-on type of fastener used for this same service. This device is applied by first pushing it into the molding channel itself. The two projecting spring arms are lined up with previously formed holes in the supporting structure and inserted to hold

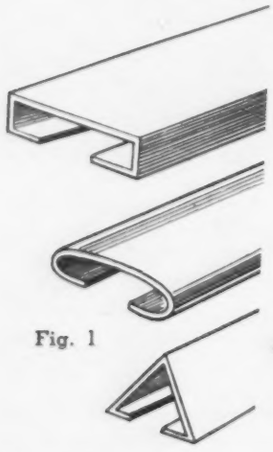


Fig. 1

Fig. 2

Fig. 4

Fig. 6

Fig. 8

Fig. 3

Fig. 7

Fig. 1—Different styles of moldings such as those shown here are accommodated. Fig. 2—Removable insert type fastener. Fig. 3—Removable snap-on type fastener. Fig. 4—Permanent type molding fastener is locked into place by twisting T-shaped prong. Fig. 6—Another design of permanent molding fastener. Fig. 7—Two sizes of another type of snap-on fastener for handling pieces of various thickness. Fig. 8—A variation of the snap-on type fastener used in round holes

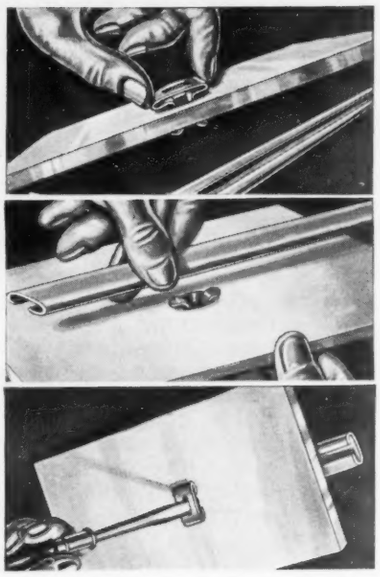


Fig. 5—Removable insert type fastener here is being placed in hole in supporting structure at top, molding is placed over fastener in center, and fastener receives a half turn with a screwdriver to engage channel at bottom

the molding firmly in place by their spring action. This type of fastener finds its widest application in various types of blind assemblies where it is difficult or impracticable to get at the back side of the support. Thus this type can be used with practically no limitations as to location of hole in supporting structure, the only requirement being that sufficient space be available behind the supporting surface to clear the inserted arms.

Fastens Permanently

Another type of molding fastener is shown in Fig. 4. This type is designed for permanently fastening moldings in place. In use, the base is first pushed into the molding channel and the T-shaped prong inserted through hole in the supporting structure. This prong is then twisted 90 degrees with pliers causing both fastener and molding to be locked securely in place. Such a fastener, of course, cannot be removed without destroying the fastener itself.

The particular fastener shown in Fig. 4 includes an upset or raised portion on the base along the side opposite the prong. This is shaped so when fastener is inserted in the molding this ear applies pressure internally to prevent vibration from loosening the fastener. The fastener shown in Fig. 4 is made in sizes to hold ⅝ x ¼-inch molding to 0.031-inch material and in other sizes for thicker material.

The unit shown in Fig. 6 also is suitable for this same type of permanent fastening but is smaller and does not have the ear maintaining tension on the channel. The part shown in Fig. 6 is used to hold 23/64-inch molding to 0.0375-inch material.

The two fasteners shown in Fig. 7 are employed to fasten open-channel moldings and in addition are suitable for use in fastening two sheets together. The small fastener is used in a 5/32-inch hole to hold 0.0375-inch material. The larger fastener is used in a ¼-inch diameter hole to hold two thicknesses of 0.0375-inch material to the supporting surface. This type of fastener is simply snapped into place from either the back or the front side of the support.

Fig. 8 illustrates a different type of fastener used to hold 0.025-inch thick molding to 0.0375-inch material through ¼-inch diameter hole. Parts shown in Figs. 2, 3, 4, 6, 7 and 8 appear in their actual size.

Cupaloy Valued For Hardness

■ A NUMBER of applications are being found for the extremely hard copper-chromium-silver alloy recently developed by Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. These applications, culmination of experiments initiated five years ago in Westinghouse research laboratories by P. H. Brace, consulting metallurgist, include welding electrodes, slip rings for generator rotors, cylinder heads in internal combustion engines and fuss clips in high tension switching devices.

This alloy, known as Cupaloy, receives its hard qualities by peculiar arrangement of chromium atoms which have been caused, by heat treatment, to group themselves to form billions of invisible crystallites distributed uniformly throughout the metal. The few silver atoms simply act as stabilizers of the alloy after it has been temper-hardened and cold drawn, thus increasing its resistance to softening effects of long exposure to high temperatures.

When Cupaloy is suddenly chilled from a temperature of some 1800 degrees Fahr. it forms a solid solution. By maintaining it at a temperature of 842 degrees Fahr. for 16 to 24 hours, chromium atoms tend to flock by themselves forming microscopic crystallites which disturb the regularity of the copper lattice. By proper choice of time and temperature, size and number of these particles can be adjusted to give a hardening effect, enormous compared with that produced by the same amount of chromium in solid solution.

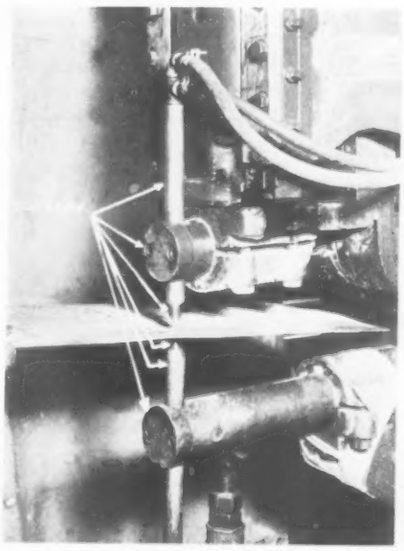
Crystallites and disturbed metal about them in Cupaloy act to key together slip planes instead of merely roughening them. One result is to make the alloy so strong that tensile stress required to produce a plastic deformation of one part in 10,000 is about 25,000 pounds per square inch as compared with something like 4000 pounds required to deform the alloy in its solid solution state. Electrical conductivity of resultant metal is increased from about 30 per cent to 90 per cent of the conductivity of pure copper.

Further Hardening Possible

This temper-hardened material still has a great deal of ductility and is able to be hardened further by drawing it through dies, rolling or hammering. These additional treatments bring the alloy to an elastic strength of 35,000 pounds per square inch with but little impairment of its heat or electrical conductivity.

While pure copper loses much of its work hardness after a few hours' exposure to temperatures of only 392 degrees Fahr. Cupaloy will withstand temperatures of 752 degrees Fahr. with relatively little permanent softening. Its rate of wear under most severe tests was only 40 per cent of that of hard-drawn copper.

Because of these properties the alloy was used at Westinghouse as current collecting surfaces for a homopolar generator rotor required to carry currents of 150,000 amperes



Cupaloy in use as welding tips on a spot welder

while under an unusually high centrifugal stress.

Previously, large machines of this type were handicapped because of lack of high-conductivity material capable of withstanding combined effects of high temperatures and racing of the rotor as it revolved hundreds of times a minute.

Welding Finds Wider Use In Machine Tool Field

■ EXCELLENT indications of trends in welding in the fields of machine design, automobile manufacture, shipbuilding and railroads, were revealed at technical sessions of the nineteenth annual meeting of the American Welding society in Detroit, Oct. 17-21, during the twentieth annual National Metal congress. Reports of several sessions of the five-day meeting appeared in STEEL for Oct. 24, pages 18 and 48; the remainder are reviewed here.

Recent developments in welded construction of machine tools were discussed by L. F. Nenninger and W. A. Maddox, Cincinnati Milling Machine & Cincinnati Grinders Inc., Cincinnati. Demands for increased accuracy in machine tools prompted detailed studies of noise and vibration and this work has provided a better understanding of the factors involved.

While castings inherently absorb remarkable amounts of vibration and so are excellent where considerable quantities are necessary for high production of standard machines, use of welded structures is definitely on the increase not only for special machines but on many borderline cases where there is little cost saving over the cast unit.

This is largely due to increased use of standard machines such as plate shears, press brakes, punch presses, hydraulic presses, nibblers, circle shears, and power cold saws, all of which reduce cost of welded structures when combined with correct machine designs. Use of press brakes especially was credited with not only reducing costs but improving appearance of machine tools. This factor of reduced cost combined with design flexibility, extreme rigidity and less vibration, results in expansion of welded structures in the machine tool industry, according to the authors.

Gives Greater Accuracy

Also, provided the welded structure is designed according to welding, not casting, principles and that the welds are stress relieved at 1200 degrees Fahr., the welded machine may be expected to attain greater accuracy and freedom from vibration and to maintain them longer. Light, good-looking welded grinders, millers and broaches, in successful service for a number of years, have amply lived up to expectations as to noiselessness and permanent accuracy.

"Spot Welding Low-Carbon and Stainless Steels," by R. L. Ringer Jr. and W. F. Hess, Rensselaer Polytechnic institute, Troy, N. Y., reported investigations as to what constitutes a good spot weld and how to obtain it. Microstructure examination was found to be the best guide to quality of a spot weld. Appearance of polished and etched cross section of welds yielded evidence which was backed up by shear tests of lap welds. These tests showed that fused portion of a spot weld should be between 40 and 70 per cent of the total thickness of the two sheets joined.

Metal Expulsion Weakens Welds

Strongest spot welds were obtained using the maximum current at which no metal was expelled from between sheets during welding. Expulsion of metal during welding leads to weak welds with cracks, blow holes and large indentations. High unit pressures of 50,000 pounds per square inch under the electrode were found to be desirable in spot welding polished 18-8 stainless steel, 0.028-inch thick. Usually special machines are required for such pressures.

Time for spot welding 18-8 stainless should not be over 1/6-second if weld is to have maximum corrosion resistance, it was pointed out. Study of contact resistances during actual welding showed that for currents of the order of 4400 amperes, which gave the strongest weld in polished 18-8 stainless steel, 0.028-inch thick, the contact resistance dropped 30 per cent during making of the weld. Tests also indicated perfect alignment of electrode tips most essential.

Subsequent discussion of this paper by I. T. Hook, American Brass Co., Ansonia, Conn., brought out that "squirting" of metal from between the sheets is sometimes necessary in spot welding bronzes to obtain maximum strength, although his experience coincided with that detailed in the paper inasmuch as maximum strength occurred in welding low carbon and stainless steels at current values just below where squirting resulted.

The paper, "Shrinkage and Other Initial Stresses in Welds," by M. F. Sayre and E. A. Winzenburger, Union college, Schenectady, N. Y., elicited much comment as it stated that tri-axial rather than bi-axial forces were involved in weld stresses. Consideration of how these forces acted and resulting creep of material was put forth as helpful in studying weld failures. Searching published literature revealed a dearth of information on weld failures and it was emphasized that much could be learned and much value derived from such a study if the facts were made available to the industry.

Interesting comparisons were made between tensile and cohesive strengths of metal, especially at elevated temperatures where tensile and cohesive strength values lie closely together. Study of these factors with the tri-axial theory might show why a slight torsion or twisting moment added to a tensile test load caused a different kind of fracture due to substitution of tri-axial for a bi-axial load.

C. H. Jennings, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., pointed out that an investigation of creep at room temperatures after slight cold working might bring out interesting results as this is undoubtedly what happens near and around welds. This also would possibly account for the decrease in locked up stresses with time, which has been noted by some investigators, especially in equipment under live loads.

Discusses Flame Hardening

Advantages and procedure in flame hardening were emphasized in "Flame Hardening" by John Sheppard, Kelsey Hayes Wheel Co., Detroit. One of most important advantages is rapidity of process, entire width of a railroad rail being flame hardened for a distance of 4 to 5 inches in less than 2 minutes. In addition, the process permits selective hardening as only those areas that require hardening are affected. Any machine steel, tool steel or alloy cast iron may be flame hardened satisfactorily, according to Mr. Sheppard, the tool steels requiring slower heating and less drastic quenching to prevent cracks.

Prominent place welding occupies in automobile body building was detailed in "Automobile Body Welding," by E. H. Foss, Murray Corp. of America, who stated that a finished auto body has in it about 5000 welds. Portion handled by various types of resistance welding and other welding methods depends upon particular characteristics of each type of application. Fourteen parts comprising a door of sound, squeakproof construction are assembled using 115 welds.

"Manufacture of Rear Axle Housings for Chrysler Cars," by E. L. Bailey and V. Knecht, Chrysler Corp., Detroit, described arrangement of equipment producing 1,000,000 yearly at rate of 270 per hour. Stock goes to a coining press

after stamping and forming to assure exact dimensions at edges, which is most important for perfect welds. Two semitubular parts are welded together to form the housing using about 1000 kilovolt amperes in making the 100-inch resistance weld. About 10,000 amperes at 280 volts, single phase, 60 cycles, is applied to the weld through a motor-generator set for approximately 7 seconds while an electromagnetic mechanism puts increasing pressure on the dies so entire length of weld is firm and complete. Condensers correct the power factor and so make it possible to deliver the correct kilovolt-amperes to the work without overloading the generator.

"Erection Sequence and Welding Procedure of All-Welded Lake Freighters," by R. W. Brendle, Great Lakes Engineering Works, River Rouge, Mich., detailed fabrication of self-propelled diesel vessels, 300 feet long, 43 feet beam, 12 feet draft, designed to meet requirements of larger load carrying capacity at no increase in size as dimensions given are largest that can be handled safely at the New York State barge canal through which the ships pass. The completed ships carry 15 per cent more cargo than riveted vessels of same size.

Vessels were constructed as much as possible in the shop. After keels were laid, shop fabricated parts were butt welded in place using shielded rod. Erection was kept about one hatch space, two days, ahead of the finish welding. In general, welding was started at the center of the ship working outward to port and starboard, and to fore and aft to control distortion. Assembly required 89 days on the building ways.

Cites Welding Advantages

Factors in favor of welding for ship building are weight and labor, according to W. E. Whitehouse, Defoe Boat & Motor Works, Bay City, Mich., in his paper describing medium size welded vessel construction. The welded vessel is lighter than its sister riveted ship and can carry more, faster, he added. Whole divisions of labor, such as drilling plates, fitting, pattern work and caulking, are eliminated by welding.

Mr. Whitehouse described an all-welded steel yacht, 115 feet long, with aluminum alloy superstructure that weighed only 92 tons instead of 125 tons required by a similar riveted design. This meant cost of construction was decreased, vessel was more comfortable, and there was an increase in speed of 4 miles per hour with the same horsepower.

To convince men of the advantages of machine gas cutting in a large steel foundry, severe tests were given the equipment which showed surprising savings. As enumerated in their paper, "Machine Gas Cutting in a Large Steel Foundry," by W. E. Murray and H. E. Horwood, Canadian Car & Foundry Co. Ltd. and Railway & Engineering Specialties Ltd., respectively, the cutting machine demonstrated its superiority over hand guidance of the torch by saving 75 per cent in time required, with a 40 per cent decrease in oxygen and with 25 per cent less subsequent grinding. A cut 30 inches long in steel 19 inches thick was made in 10 minutes.

In the actual production setup, steel castings are brought to the cutting machine on a conveyor. After heads and risers have been cut off flush with the casting, it is ready for shipment to the machine shops, the automatic torch producing a smoother cut than the hand operated torch. Cutting is done on both sides of the conveyor line simultaneously. Two operators spot the castings and work the cranes. Castings are placed on plates to facilitate moving about on conveyors and to speed up spotting.

Rail Welding Increases

"Flash Welding of Rails," by H. C. Drake, Sperry Products Inc., Hoboken, N. J., detailed equipment employed by the Delaware & Hudson railroad in flash butt welding of high carbon, large section rails up to one mile in length. According to Mr. Drake, more than 6600 tons of 131-pound steel rails were welded by this process in 1937. Equipment for making fatigue tests on full section welded joints utilized a rolling wheel load machine. Welds on test were inspected daily for incipient cracks by passing a current of 2000 amperes through the joint and taking unit potential readings along the rail head through the weld zone. Two and a half years' continuous operation of the rolling load machine on all types of welded joints revealed flash welding quite suitable. Here ends of rails to be joined are brought together, a heavy current passed through them for about 1½ minutes to preheat them, followed by moving in and out of contact for 15 seconds—the flashes of current bringing the ends to fusion. This is followed by a quick push up at pressures up to 10,000 pounds per square inch which completes the weld.

Comparatively little difficulty is experienced in securing sound welds but proper stress relieving is most essential. Final procedure adopted consists of three phases: When weld is completed, it is immediately removed and allowed to cool in air for 3½ minutes, permitting heat to work back into rail. Next weld is brought up to 1250 degrees Fahr. in 3 minutes, using an oil-fired furnace with pyrometer control. In the third step, the joint is removed from the furnace and covered with an asbestos hood which allows the weld to cool to approximately 600 degrees Fahr. in 20 minutes at which time hood is removed. Subsequent cooling down to normal temperature takes place in open air.

Welds given this treatment revealed no evidence of incipient cracks even after rigorous fatigue tests. Also etched cross sections disclosed sound homogeneous welds.

Since the ridge of flash or upset metal around the weld is extremely hard and its removal involves time and expense, tests were run to determine how much of this should be removed. Fatigue cracks which developed due to concentration of stresses at base of fillet indicated it was desirable to remove all the flash except on web and upper side of base. A shear attached to the welder removes flash under rail base immediately after welding; flash around head and outer edges of base is removed by grinders.

To insure duplication of correct welding cycle, equipment is automatic. As additional safeguards to weld quality, permanent records of welding voltage, wattage and platen movement, as well as stress-relieving temperatures, are made for every weld fabricated.

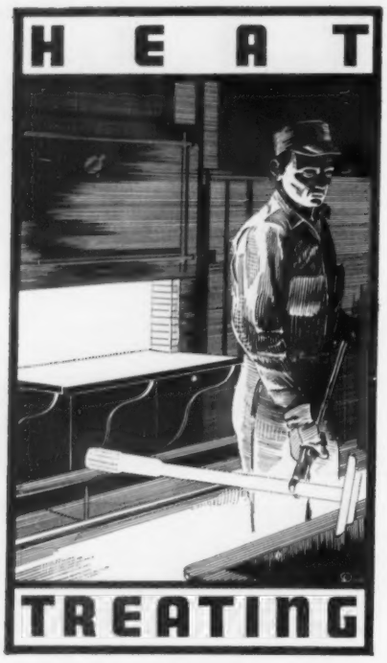
Boardman New President Of Welding Society

■ A paragraph on page 18 of the Oct. 24 issue of STEEL announcing newly elected officers of the American Welding society was made confusing by a typographical error in the first line. This paragraph should have read as follows:

"Harry C. Boardman, research engineer, Chicago Bridge & Iron Co., Chicago, was elected president to succeed Philip G. Lang Jr., engineer of bridges, Baltimore & Ohio railroad, Baltimore. Col. G. F. Jenks, ordnance department, United States army, Washington, was named senior vice president, and Turner C. Smith, structural engineer, General Petroleum Corp., Los Angeles, second vice president."

Plates Plastic Surfaces

■ A bond coat which gives plastic surfaces an affinity for metal plate now makes possible the successful plating of plastic bases, according to originators of the process, Metaplast Corp., 244 Fifth avenue, New York. Platings up to 1/100-inch can be applied. Interesting decorative possibilities are suggested by the fact that these metallic applications may be masked.



Bright Annealing Wire

Continuous furnace anneals strands individually, each strand passing through a pipe containing prepared atmosphere. Accurate control produces grain size desired

By J. B. NEALEY

■ FINE WIRES of brass, bronze, nickel, silver, monel and other nonferrous metals and alloys are drawn by F. A. Harris Inc., Springfield, Mass. Customers use this wire for making fine springs, resistance units in radios, for weaving into wire cloth for filters or for paper mills, and so on. Here a new type of gas furnace is being used to obtain a uniform heat that is controlled to produce at will definite grain sizes in the metal.

Raw material is ⅛-inch round wire stock. This is drawn down, in successive steps, to the finest sizes. During drawing, each reduction is usually followed by an anneal, for drawing hardens the metal. Frequency of the anneal varies with the type of wire being drawn. Tungsten carbide dies are used in reducing large wire and diamond dies for small sizes. The machines, Fig. 2, are continuous, with number of drafts or dies varying from 10 to 22 in a single operation. A sample customer specification, picked at random as an indication of the kind of work done, calls for a phosphor bronze (tin 8 per cent) wire, 0.0095-inch in diameter, tensile strength 73,000 pounds per square inch and yield point 56,000 with an elongation of 55 to 60 per cent.

Making this wire depends upon properly processing the preliminary operations such as breakdown, draw and anneal. Great care must be exercised in final drawing operations to keep a uniform stress in draft and to see that the diamond dies are perfectly round and true so the wire is not weakened by longitudinal lines or scratches. It is extremely important that the annealing be controlled properly so this calls for strand, as against bulk, annealing.

Pioneered in Furnace Design

Early furnace in this country in which wires of this type were correctly annealed was designed and built by F. A. Harris. With the accumulation of much experience through the years, Mr. Harris has designed and built for his new plant an exceptionally long and efficient strand annealing furnace.

Most furnaces of this type are 10 to 12 feet in length but this one is 18 feet long. Chief advantage of a furnace of this length is that a perfect anneal can be obtained without forcing the heat. Forcing a shorter furnace means that a uniform grain structure throughout the length of the wire is hard to obtain. An inferior product results. Wire cloth, for instance, tends to develop weak spots and premature failure in service.

On the other hand, there are limits to the length of furnace. One much longer than 18 feet might

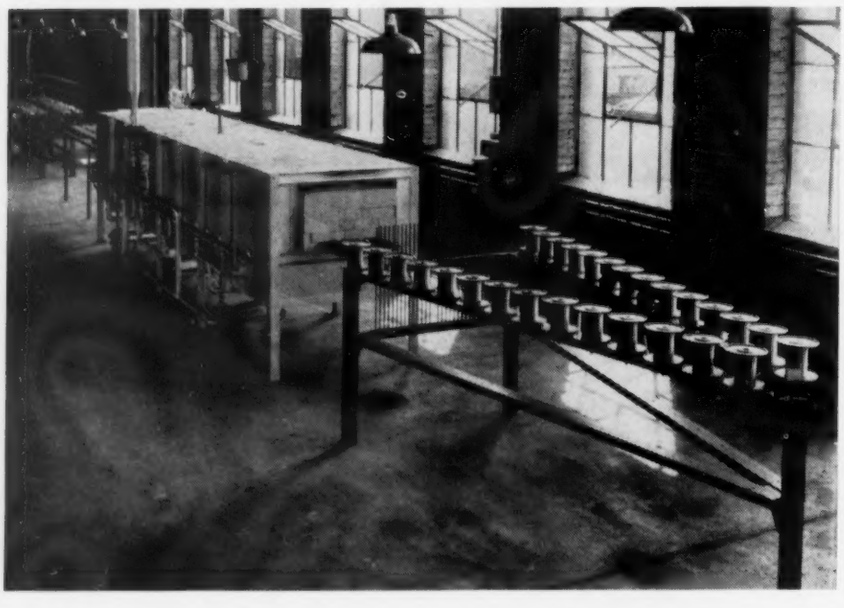


Fig. 1—Continuous strand annealing furnace employs automatic temperature control. Strands pass through pipes in heating chamber. Pipes contain prepared atmosphere to assure bright finish

bring about variation in wire size, due to elongation of the wire caused by the greater tension necessary to pull it through at the required temperature.

Heating chamber of this furnace is 25 inches wide and 14 inches high from hearth to top of arch, inside dimensions. It is surrounded by 9 inches of insulating refractory and is held within a steel shell as shown in Fig. 1. This furnace holds up to 120 lengths of ordinary iron pipe of small size and a single strand of wire passes through each. Pipes protrude from the furnace at each end. A steel frame holds spools from which the wire is unwound at the charging end. A similar frame at the discharge end holds a similar number of reels on which the wires are wound as they are pulled through the furnace and pipes.

Beside keeping the wires from tangling, these pipes also serve as muffles in which prepared atmospheres are employed to insure bright annealing. Different products require different types of atmospheres such as carbon dioxide, nitrogen, hydrogen and city gas. These atmospheres are introduced through manifolds of block castings, about 3 feet from the discharge ends of the tubes. Tubes are cut at this point and their ends screwed into these manifolds with just enough separation to permit the flow of gases.

Heat With Gas

Furnace temperatures range from 700 to 1650 degrees Fahr. while speeds at which the wires are pulled through vary from 50 to 600 feet per minute. Heat is supplied by 52 gas burners, half on each side, which underfire the hearth. These gas burners are manifolded in three groups so the furnace has three separately controllable temperature zones. Furnace is set on short legs to provide room for the gas and air supply mains below.

Gas burners on both sides of each zone are all manifolded to a single inspirator in the air line to which the gas line is connected after passing through a zero governor. A positive pressure blower supplies air to the three inspirators at 20 ounces pressure. While all three zones are controllable, control of the center zone suffices for most of the work. A thermocouple in the top center actuates a potentiometer type controller which operates an on-and-off solenoid valve in the supply line to the center group of gas burners. This valve is by-passed to provide a low setting of the gas flames when the valve is in the off position.

This furnace is also unique in its internal construction which embodies a series of U-shaped tray sections of unusual strength and wear resisting qualities. While no flame comes in contact with the work the chamber containing the work is entirely filled with the products of combustion which prevent any free air from reaching the work (in this case, pipes). These U-shape sections have tapering tunnels which intensify the entrainment of the furnace atmosphere with the newly burned gases, reducing the temperature in the combustion chamber. This prevents burned firing chambers and burner ports.

New Furnace Features

Removable tuyere blocks and a supplementary bottom are something entirely new in furnace construction, it is claimed. The tuyeres or burner ports are individual sections corresponding to the tray stop. The holes are molded in the brick rather than drilled, since a kiln dried surface will last longer than a tool cut surface. The supplementary bottom of 1⅛-inch firebrick extends under the whole tray and facilitates replacements by protecting the actual bottom of the furnace, keeping it a smooth and level surface on which to assemble the new tray.

Previous furnaces were discarded for this work because they developed hot spots which reduced their capacity and efficiency and because of inability to control temperatures and obtain uniformity in heating. Also, a more expensive construction was necessary. However, the furnace described is now handling this exacting work quite efficiently.

Fig. 2—Continuous wire drawing machines contain from 10 to 22 drafts, or dies, each and produce extremely fine size non-ferrous and alloy wires

Map Shows Location of Pulp and Paper Plants

■ *Map of Pulp and Paper Mills of the United States, Canada and Newfoundland;* available in three sizes, 22 x 31 inches, 32 x 44 inches and 60 x 84 inches; paper, cloth back, wall board back, or roll type; published by J. H. H. Muirhead, New York; supplied by STEEL, Cleveland, at prices ranging from $1.50 to $3.50 for small size, $2.50 to $10.50 for intermediate size, and $18.75 to $40.00 for large size.

This map is based on data from directories of the industry and supplemented with information from governmental departments, railroads and the companies themselves. All cities, towns and villages having pulp and paper mills are designated to show the extent of the industry at a glance. So many plants are located in Maine, Vermont, New Hampshire, New York, Massachusetts, Rhode Island, Connecticut, Eastern Pennsylvania, New Jersey, Delaware and Maryland that a large scale map is inserted.

Below the map is a list of the firms or companies operating in each place. Classification of the industry is indicated by letters in front of company names, the letters being keyed to an index. When no letter is given, the product of a works is not one of the standard classifications comprising the major portion of the industry.

Products are classified under the following headings: Ground wood pulp; soda pulp; sulphate pulp; sulphite pulp; book paper; building paper; newsprint paper; paper board; tissue paper; wrapping paer; and writing paper.

Manufacturers supplying equipment, steel and nonferrous metals to the pulp and paper industry will find this map of considerable interest and service.

Coercive Force Measures Carbon Content of Steel

■ NEED of those engaged in operating open-hearth steel furnaces for rapid methods to determine carbon content of samples taken from the molten metal already has resulted in development of two nonchemical procedures. One of these involves the measurement of electrical resistance of the sample; the other depends primarily upon the magnetic permeability of the sample. Recently, a third and new method, based on determination of the coercive force of cast samples, has been devised by the metallurgical division, bureau of mines, Washington.

The new method was described by B. A. Rogers, Karl Wentzel and J. P. Riott, associates of the bureau, before a session of the annual meeting of the American Society for Metals in Detroit, Oct. 17-21, during the twentieth annual National Metal congress. A number of sessions of the five-day meeting were reported in STEEL for Oct. 24, pages 15 and 55; several other sessions are reviewed on these pages.

Coercive force of a piece of steel may be defined as the intensity of the magnetic field that must be applied in the direction opposite to that in which the specimen was originally magnetized to reduce the magnetic flux to zero. The measured value of coercive force depends upon whether the total flux due to both the specimen and the field of the demagnetizing coil or only that part contributetd by the specimen is reduced to zero.

Coercimeter Most Suitable

A number of devices are available for determining the coercive force of bar samples. Of these, the coercimeter was selected as being the most suitable for the problem on account of the simplicity of the apparatus and the ease of operating it.

Essential elements of the coercimeter are the primary winding and the secondary coil. When current is passed through, a magnetic field is built up which tends to demagnetize the specimen. The secondary coil can be displaced axially from a position where its geometric center coincides with that of the specimen to a point beyond the influence of the latter. When such a motion is made, the galvanometer to which this coil is connected will register a deflection unless the demagnetizing field has been increased to a value just sufficient to produce zero magnetization of the specimen; that is, to a value equal to the coercive force.

In outline, the process of taking and testing samples is simple: A spoonful of the metal is killed with a considerable quantity of aluminum rod and poured into a special split mold. As soon as the top has solidified, the mold is opened and the little ingot allowed to drop into the cooling medium. A specimen of the desired length is then cut or broken from the bottom of the ingot, magnetized, and placed in the coercimeter for testing. Actually, a certain amount of experimentation was involved before a satisfactory technique was attained.

In the beginning of the investigation, magnetic measurements were conducted upon two different lengths of samples. One type was about 3 inches long and the other, 1⅜ inches. Both lengths of specimens were cut from the bottom portion of the ingot, the shorter being cut from the bottom of the longer after it had been tested.

Since the long specimens could not be inserted in the gap of the electromagnet, they had to be magnetized in the coercimeter itself. With this arrangement a field intensity of 550 oersteds was the maximum obtainable, whereas the short specimens could be subjected to a field strength of 3000 oersteds. Apparently, the test pieces must be magnetized practically to saturation if good results are to be obtained, and this condition is probably not reached at the lower field strength. The electromagnet used for the short specimens was designed for operation on a 110-volt direct current circuit. It was capable of producing a field of 7000 oersteds in its 1⅜-inch gap, but less than half this strength was required to produce practical saturation of the samples.

Drillings for carbon analysis were taken either from the short specimen actually tested or from the part that had been immediately adjacent to it. The analyses were conducted by the method of combustion in oxygen.

Occasionally, samples showed readings of coercive current which did not agree with the carbon content as obtained by chemical analysis. There are several causes for these discrepancies. First, the ingot may not drop out immediately when the mold is opened. Specimens broken from such ingots will indicate too low a carbon content. A second, and in these experiments fairly frequent, source of disagreement arises from heterogeneity of the specimen with respect to carbon content with consequent difficulty in calculating the correct average. Samples taken soon after the addition of ore or pig iron constitute the bulk of such cases.

Carbon Content Varies

It was, of course, anticipated that metal taken after such additions would not be representative of the bath, but this fact in itself was not considered a disadvantage in establishing a relationship between coercive current and carbon content. However, the opposite ends of some samples showed differences of 0.02 or 0.03 per cent, and a variation of more than 0.05 per cent carbon was observed in more than one instance. Third, specimens which have cavities are likely to give readings which correspond to more carbon than is actually present. Failure to kill the metal properly is one cause for such cavities. A fourth cause for incorrect readings is mushiness of the metal when poured. This condition, which occurs frequently when the temperature of the steel bath is low, causes the readings to indicate too much carbon.

In the field of hardness testing many studies have been devoted to the effort to distinguish between the intrinsic resistance of a metal to permanent deformation and the added resistance due to strain hardening, occurring after permanent deformation has begun. Both of these properties are included in the conventional hardness tests, with any of the currently used testing machines. The experimental determination of the first named property, which has been termed "absolute hardness," is difficult. While several attempts have been made to accomplish such a determination, more attention has been paid to theoretical deductions.

These experimental determinations and some theoretical deductions made from conventional hardness tests were discussed by E. G. Mahin, professor of metallurgy and head of the department of metallurgy, and G. J. Foss, Jr., graduate assistant in metallurgy, University of Notre Dame, Notre Dame, Ind.

It is generally recognized that all of the conventional hardness tests, as applied to metals, measure finally the resistance of a strain-hardened material and that they provide no indication whatever as to the resistance capacity of the metal as it was before the hardness test was begun.

The experimental method devised for the direct determination

of absolute hardness is based upon the removal of metal instead of upon its displacement, and strain-hardening effects are thus entirely avoided.

Experiments having for their object the determination of the effect of cooling rate and actual grain size on the notch toughness of a steel in directions transverse and parallel to the direction of its rolling were reviewed by O. W. Ellis, director, department of engineering and metallurgy, Ontario Research foundation, Toronto, Ont., and J. E. McDonell, undergraduate student, Queen's university, Kingston, Ont. An attempt was made to explain the results of these experiments, the suggestions being made that the reduction in the notch-sensitivity of this steel brought about by quenching is due largely, if not entirely, to an increase in its cleavage strength and that the effects of fiber in this steel must be to reduce its resistance to plastic flow rather than to alter its cleavage strength.

Gun Erosion Studied

Erosion of gun barrels is the enlargement of the bore and obliteration of the rifling. Average life of a machine gun barrel is between 4000 and 5000 rounds due to loss of accuracy caused by ruinous effects of erosion. One of the causes of erosion is cracking and spalling of the bore surface through formation of a hard layer of low ductility. Two explanations have been offered concerning this white layer, one view being that the layer consists of martensite and the other that it is the result of a nitriding action.

The latter viewpoint was substantiated by an investigation made at the University of Michigan, Ann Arbor, Mich., by W. P. Wood, professor of metallurgical engineering, and W. H. Snair, a graduate student and now metallurgist, research department, American Can Co., Maywood, Ill. Evidence obtained by metallographic means and use of X-rays indicated the presence of nitrides. Finally, it was found that by duplicating the probable temperature conditions in the gun barrel it was possible to produce a layer apparently identical with the one observed in barrels eroded in service.

The investigators concluded, therefore, "that the white layer formed during the erosion of machine gun barrels is a solid solution of nitrogen and nitrides in austenite and alpha iron. The nitriding seems to take place at a temperature of 900 degrees Fahr."

For several years the national bureau of standards, Washington, has been employing with good success a lapping method for prepara-

(*Please turn to Page* 64)

A.I.M.E. Sessions Deal with Bearing Metals, Steelmaking Practice, Iron

■ MECHANICAL properties and metallography of iron, steelmaking practice, and bearing alloys were among subjects discussed at the fall meetings of the Iron and Steel and Institute of Metals divisions of the American Institute of Mining and Metallurgical Engineers in Detroit, Oct. 17-19, during the National Metal congress. These sessions are reviewed herewith; other features of the program were reported in STEEL for Oct. 24, pages 16 and 42.

Analyzing the structure of iron after compression, Charles S. Barrett, metallurgy department, Carnegie Institute of Technology, Pittsburgh, described one test method used, which involved compressing specimens by rolling them successively in many different directions which permitted deformation up to the limit set by the capacity of the material to flow without fracture. This method and more conventional means of compression were applied to alpha iron, and the results analyzed by a special optical method, as well as by standard X-ray procedures.

Mr. Barrett pointed out that single crystals of individual grains of alpha iron, in general, do not seek a single orientation during deformation by compression, it being concluded that slip occurs on a considerable number of slip systems to produce the orientation texture.

Swedish Research Presented

Results of a four-year study on the solidification of rimming steel ingots were presented by A. Hultgren, professor of metallography, Swedish Institute of Technology, Stockholm, who worked in collaboration with G. Phragmen, also of Stockholm, on his research program for Swedish ironmasters. Dr. Hultgren showed numerous slides of sectioned ingots which revealed graphically the size and location of blowholes, ring holes and other discontinuities occurring in ingots under different conditions of analysis, cooling, pouring temperature, etc.

Study of the effect of phosphorus on the properties of iron was reported by Heihachi Kamura, Meji College of Technology, Japan. His tests covered a complete series made on pure iron with the addition of phosphorus in percentages up to 1.0. In summation, he pointed out that the effect of phosphorus on mechanical properties is similar to that of carbon in iron. Tensile strength and elastic limit were increased appreciably in one case with the addition of 0.65-0.70 per cent phosphorus. The metal also showed pronounced effect on the magnetic properties of iron, registering a gradual improvement up to 1.0 per cent, although optimum conditions were found at 0.7-0.8 per cent.

Tests Bearing Alloys

Hardness of a bearing alloy is a property closely related to many of the service requirements of the modern bearing. With a duplex microstructure, the measurement of bearing hardness by any of the usual commercial devices means little, hence, the development of the Bierbaum method of measuring the hardness of individual constituents. Results of microcharacter hardness tests on a number of bearing alloys were reported by L. L. Swift, Cleveland Graphite Bronze Co., Cleveland.

The Bierbaum test measures the scratch-hardness of a solid by pulling a weighted diamond point over the surface. The point is ground so that it is the corner of a cube and mounted with the cube diagonal in a vertical position. Since width of the scratch will vary inversely with the hardness, a formula has been developed to express microhardness.

Tin-base babbitt, lead-base babbitt, cadmium-nickel babbitt, cadmium-silver-copper babbitt and copper-lead alloys were studied by Mr. Swift. Comparison of the microhardnesses of these alloys with their values as bearing alloys can only be general, he stated. The hardnesses of the matrices give a general idea of the plasticity of the alloys, and if this is true then lead-base is the most plastic, while tin-base and cadmium-nickel are about the same.

Relationship between hardness of the crystals in a babbitt and the crankshaft steel is of some importance. Copper-tin crystals generally are considered harder than a steel crankshaft and have been known to scratch it. Relation between hardness and wear appears indefinite. It has been claimed that copper-lead alloys cause excessive wear of crankshaft steel, although the copper matrix of copper-lead alloy is not nearly as hard as the intermediate phases present in other bearing alloys. Coefficient of friction and ability to maintain an oil film are two other properties which may be correlated with the microhardness of a bearing metal, but the exact relationship is indefinite.

NEW METAL PRODUCTS

■ Added recently to earth-moving equipment of the Ohio state highway department, this Comet shovel, a

product of Hanson Excavator Works, 224 South Michigan boulevard, Chicago, has been designed for mounting on a Four Wheel Drive 5-ton truck.

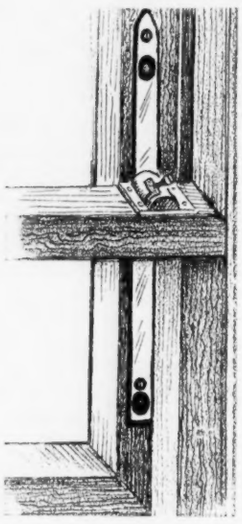
To reduce hazard of having shovel boom extend over cab, Four Wheel Drive Auto Co., Clintonville, Wis., built this one-man cab to permit boom to ride beside driver when truck travels on the highway. With this arrangement, front sheives of boom are no higher from the road than the shovel cab. Where ability to travel from one job to another is an important factor, this type of truck-mounted shovel has a distinct advantage over crawler type shovels.

■ An effective means of reducing heat loss through and around windows is provided by a combination screen and storm unit recently announced by F. C. Russell Insulation Co., Baltimore.

Unit consists of a sturdy frame

of a specially processed galvanized sheet metal, known as Armco ingot iron Paintgrip. Easily interchangeable panels of glass and screen fit into frame. Built into window is an adjustable closure strip which butts tightly against house window frame, forming a permanent weather-stripping seal against air leakage.

■ Designed for protection of homes that have windows easily reached from the outside or leading to fire escapes, a window lock, known as Ventilock, has been introduced by



G. Danzis Co., 111 East Twelfth street, New York.

Lock is adjustable so that windows open for ventilation can be locked in place. With this device, window is always locked, whether open for ventilation or closed. Lock is installed easily and does not damage window sash. Retail price is 35 cents.

■ Cameron Machine Co., 61 Poplar street, Brooklyn, N. Y., has developed a simplified type roll winder, known as Camachine 44W, designed to produce uniform and hard rolls in connection with bag presses, coating, waxing, drying, saturating, gumming and embossing machines.

Machine will handle any kind of paper or fabric, producing evenly wound rolls up to 36-inch diameter at speeds up to 1000 feet per minute. An automatic system of counterweights provides for decreasing pressure on rewound rolls as they grow in weight and diameter. Machine is furnished in stock widths of 42, 52, 62, 72 and 82 inches.

■ A new application of steel is found in the construction of an improved Humidifier-Inhalator unit introduced by Mayflower-Lewis Corp., St. Paul, for hospital and home use.

Consisting principally of a cabinet and tank, both of which are formed of 22-gage Galvaneal, unit is designed for maximum efficiency in vaporization of water. Only water

coming in immediate contact with heating element is vaporized, the rest never rising above 100 degrees F'ahr. There is no dissipation of radiant heat. Unit holds 1½ gallons of water and evaporates a full pint per hour. Electric circuit is broken automatically when water is exhausted.

Copper is used in construction of the boiler section, the automatic float cutoff and for casing of the heating element.

■ Simulating human arm motion, a mechanical device called the Shake King, just introduced by Shake King Corp., Chicago, utilizes the same familiar metal shaker and glass graduate used by bartenders in mixing drinks. By merely inserting these containers in space provided on the arm the machine is automatically set in operation by a solenoid switch and is shut off when containers are removed. An added feature is an

advertising panel on shaker arm, which is lighted from the rear when machine is in operation.

As seen in accompanying illustration, this appliance is composed essentially of zinc alloy die-cast base and shaker arm.

Welds Large Coke Drums Made From Carbon-Molybdenum Steel

■ PRODUCTION of higher efficiency gasolines today awaits only the availability of processing equipment able to withstand higher pressures and temperatures necessary to produce gasolines of higher octane ratings.

Typical of the trend in this equipment are the four large coke drums recently completed by Petroleum Iron Works, Sharon, Pa. These drums are made entirely from carbon molybdenum steel, type A. S. T. M. specifications A-204-37T, grade B. This is a material of 70,000 to 82,000 pounds per square inch tensile strength and contains approximately 0.5 per cent molybdenum. It is employed because of its good creep characteristics at high temperatures. Since these drums operate at 435 pounds per square inch pressure and a temperature of 870 degrees Fahr., creep becomes highly important.

These drums measure 12½ feet overall diameter, 52½ feet overall length and have an inside diameter of 12 feet with the straight portion of the shell 40 feet in length. Shell and elliptical heads are 2⅝ inches thick, although thickness varies up to 7½ inches at some of the reinforcing rings. The straight portions of the drums are built up of 5 ring sections, each ring section being formed from a single plate.

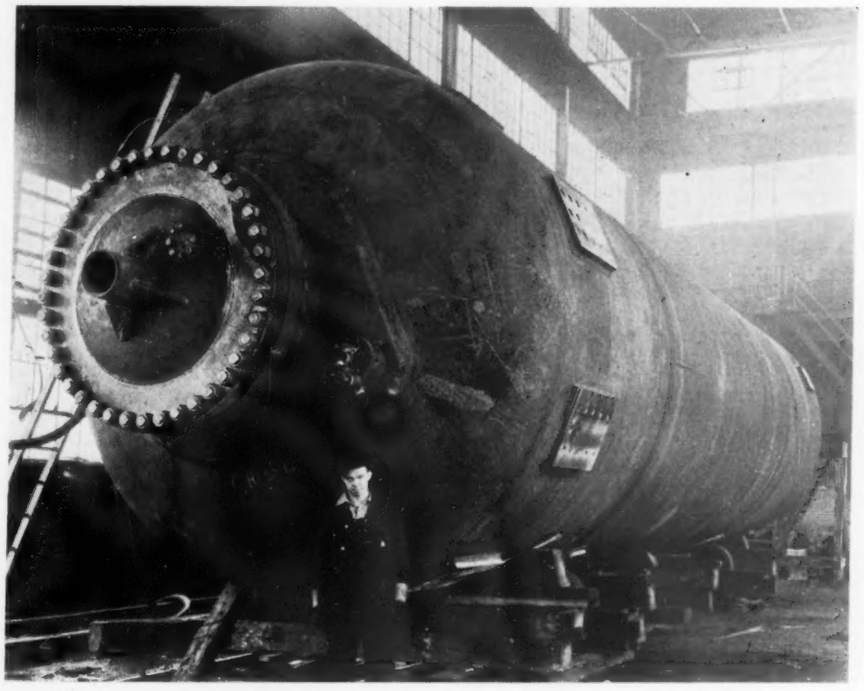
Openings include a 48-inch diameter bottom manhole having a 7-inch flange and closed by a cover 6 inches thick weighing 6200 pounds, a top manhole 36 inches in diameter with a 5-inch thick cover weighing 2950 pounds. Also there are four smaller flanged connections in the top drum head and several in the shell.

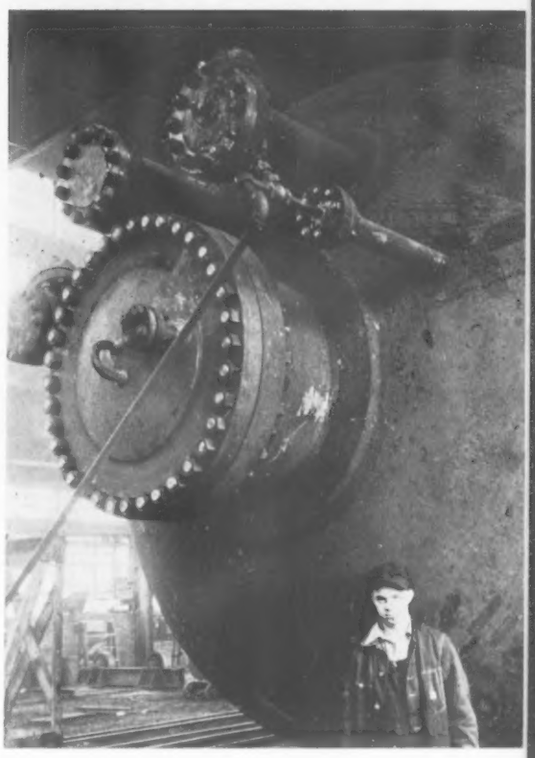
Since these drums were built for oil refinery service, they were constructed according to A. P. I.-A. S. M. E. code requirements which necessitated stress relieving after welding and X-raying of all seams.

Joint efficiency was 95 per cent. Each drum received a 915-pounds-per-square-inch hydrostatic test before shipment.

This size drum is largest that could be accommodated by railroad clearances, these being the largest carbon molybdenum steel drums yet built, it is said. Each drum weighs 130 tons and will be supported by eight lugs built up of heavy welded steel plates.

Huge "moly" steel coke drums are all-welded. They will operate at a temperature of 870 degrees Fahr. under a pressure of 435 pounds per square inch





Openings were reinforced with welded-on rings, extending thickness up to 7½ inches at some points. Here all openings are sealed for the hydrostatic test at 915 pounds per square inch

Electrode for Cast Iron Has Non-Ferrous Coating

■ A heavily coated, shielded arc electrode, designed for depositing a soft, machinable alloy on cast iron, has been announced by Lincoln Electric Co., Cleveland.

Intended primarily for use in correction of machining errors, filling up defects and for producing a very soft drillable weld in gray cast iron, this nonferrous alloy coated wire is designed so as to cause the weld to flow over and bond to cast iron with a minimum of penetration or heating of base metal.

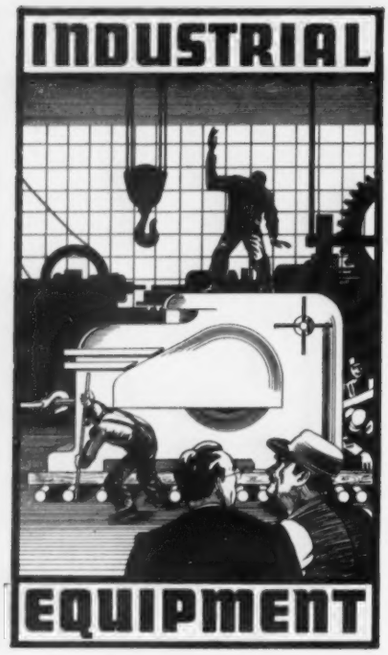
Electrode size is 5/32-inch by 16 inches. It operates best with direct current negative polarity, although alternating current may be used.

Prevents Adhesion of Spatter in Welding

■ Jaws of welding machines used in flash welding can be kept from loading with spatter, it is claimed, by application of a white pigmented water soluble compound introduced by Wayne Chemical Products Co., Detroit.

With the usual method of scraping this spatter it has been necessary to clean jaws every 12 to 15 welds, but applications of this new coating are said to keep spatter from bonding for 70 to 75 welds.

Aside from preventing adhesion of spatter, coating is designed to act as a flux and give a more uniform weld on all automatic ring welding operations. There is less tendency of rod to short out.

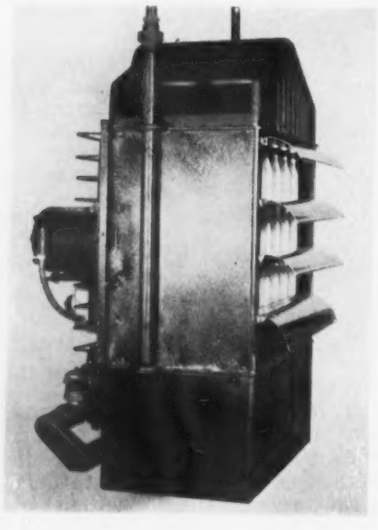


Heats, Cools or Dries

■ Automatic Gas Steam Radiator Co., 490 Brushton avenue, Pittsburgh, has added to its line of heating equipment a new gas-fired unit heater which operates without steam or water and is completely self-contained.

Suitable for many types of commercial and industrial buildings such as stores, garages, churches, schools and manufacturing plants, heater is suspended from the ceiling, out of the way, and employs natural or manufactured gas for fuel. In addition to heating, it may be adapted for other purposes such as ventilating, cooling and drying.

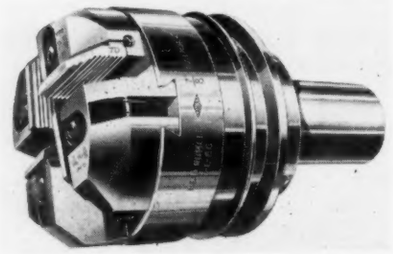
Operation and construction of unit is quite simple. The gas fires into a combustion chamber, products of combustion being passed upward through a bank of tubes and out at rear of the housing. Air is passed around these tubes by means of a motor-driven fan located at back of the unit. Assembly includes a safety pilot which turns off the gas if the pilot goes out or burns too low to insure ignition. There are five sizes ranging from 85,000 to 200,000 B.t.u. per hour.



Adapts Die Head to Special Auto Operation

■ Landis Machine Co., Waynesboro, Pa., recently modified its ⅞-inch Landex type L die head to meet special production requirements of a large automobile plant which needed a head for cutting thread on the front wheel upper control arm of the knee action assembly.

This particular part is a steel forging and has an odd shape. A sharp bend immediately back of the threaded section made it difficult to adapt a die head of sufficient capacity to handle the required diameter and at the same time clear the sharp bend to permit cutting a thread of satisfactory length. Illustration



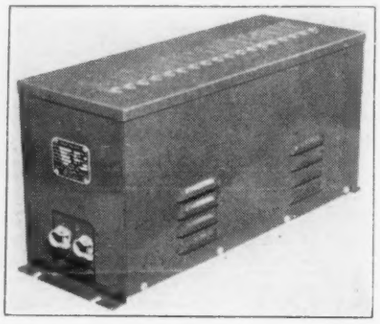
shows the head which is being used for this cut. A set of special wide chasers is employed. Chasers are milled off on an angle to clear the bend. Chaser holders are beveled also to eliminate any interference or possibility of their striking control arm during threading operation.

Adjusts Varying Voltage

■ Raytheon Manufacuring Co., Waltham, Mass., has developed an automatic voltage regulator which permanently corrects varying voltage conditions and provides the constant alternating current voltage. Since it will stabilize at any load within rating, it may be used as an accessory to devices already installed.

Equipment benefited by stabilized voltage are X-ray machines, color comparators, photo-printing devices, photometers and amplifiers used in talking motion pictures, radio transmitters and telephone apparatus. It is also used by laboratories in electrical experimenting.

Regulator is a magnetic device without moving parts or adjustments and can be made to operate from any commercial alternating current power source and deliver one or more required voltages with power outputs up to several thousand voltamperes. Some manufacturers build regulators into their apparatus as original equipment, making such assemblies free from



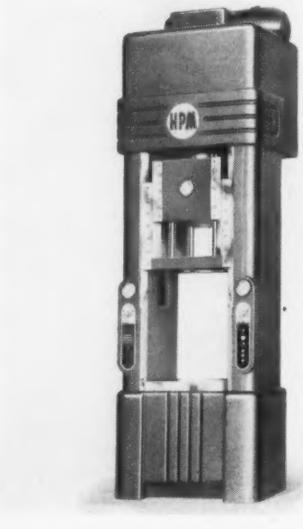
manual voltage adjustments and more suitable for use in the hands of unskilled operators or at unattended locations.

Streamlining Adapted to Heavy Pressure Machines

■ Hydraulic Press Mfg. Co., Mt. Gilead, O., is pioneering in the streamlining of heavy pressure machinery and has introduced a series of "Smooth Line" Hydro-Power Fastraverse presses to prove conclusively that style distinction can be added to this type of equipment.

These presses are compactly self-contained with operating unit, including the H-P-M model 4R radial pump, mounted overhead and totally enclosed to harmonize with entire press styling. All piping and control mechanisms are concealed, yet every operating element is accessible for adjustment.

Fastraverse system of operation is said to assure production speed with hydraulic smoothness and versatility. Principle results in rapid ram travel to the work, a slower pressing speed to permit metal to

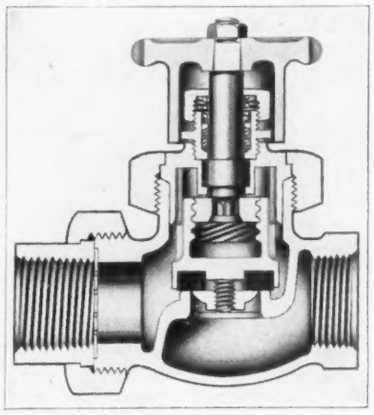


flow to contours of the die, and a speedy return of the ram to its initial position. Lost motion and lost time thus are reduced.

Globe Valve Designed For Use on Air Lines

■ Crane Co., 836 South Michigan avenue, has designed a brass globe valve, known as No. 237, for air installations where quick-opening, quick-closing valves are needed, especially in mines on air lines leading to pneumatic hammers.

Among its features are an apron on wheel to protect upper part of valve from rough handling and a brass screen in the union connection at valve inlet to keep out foreign matter. Valve is furnished in ¾-inch and 1-inch sizes and is recommended for 150 pounds pressure.

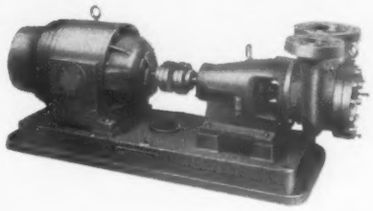


Non-rising stem opens or closes in about a three-quarter turn. It is held from vertical movement by shoulder which rests between bonnet and stuffing box.

Pump Is Supported by Heavy One-Piece Cradle

■ Ingersoll-Rand Co., Phillipsburg, N. J., has presented a new series of refinery pumps known as Class FH and FL. Built in capacities to 800 gallons per minute and heads to 400 feet, these pumps are designed for such refinery processes as those in which hot oils, distillates, bottoms, cold oils, propane, butane, solvents, etc. are handled. They will handle fluids at any temperature and are constructed for continuous operation on severe service.

Pump is supported by an extra heavy one-piece cradle which combines connecting piece, bearing housing and a water-jacketed oil reservoir. Its design is such that suction and discharge connections are integral with the casing. They open vertically and are therefore self-venting. Positive lubrication of bearings is effected by rotary discs, oil being contained in a large water-jacketed reservoir and circulated to secure thorough cooling. Stuffing box is likewise water-cooled, reducing heat transfer to pump shaft and bearings. It is extra deep to receive



a sealing cake if conditions warrant. Wearing rings on impeller permit renewal of worn parts with standard parts from stock.

Molybdenum Added to Toughen Hacksaw Blades

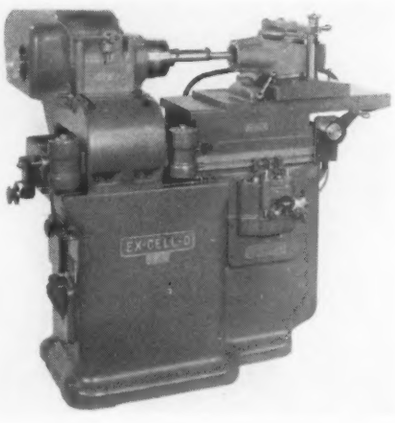
■ E. C. Atkins & Co., 429 South Illinois street, Indianapolis, have incorporated the special values claimed for molybdenum steel in their A-Mol hacksaw blades, which are said to resist severe breaking strains and give remarkable service in both machine and hand saw operations.

Blades are made in all standard sizes, lengths and widths, there being 9 hand blades, 10-inch and 12-inch and having 18, 24 or 32 teeth to the inch. In power blades there are 32 different sizes, ranging from 12 to 24 inches in length, 1 inch to 2 inches wide and having 4 to 14 teeth to the inch.

Maintains Alignment of Differential Diameters

■ Ex-Cell-O Corp., 1202 Oakman boulevard, Detroit, has developed a single-spindle precision boring machine for simultaneous boring of two diameters in a differential housing.

Machine carries a fixture with a

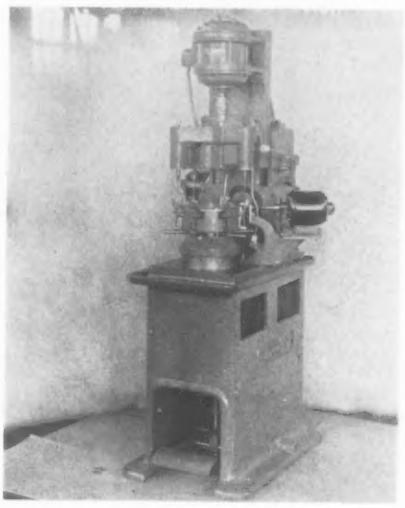


sub-slide parallel to the main table slide, increasing total stroke for loading the part. Fixture also has a cross slide which allows part to be indexed over after approach of fixture to the tool, just before main table feed is cut in. This permits front boring tool to clear shoulder between diameters to be bored.

Both slides are operated by hydraulic cylinders, controlled through a valve at front of the machine. Tungsten carbide tools are used for this operation.

Unit Drills and Taps Textile Machine Parts

■ Langelier Mfg. Co., Providence, R. I., has designed and built a vertical type drilling and tapping machine, with hand-operating indexing



dial, to be used for drilling and tapping textile lubricating saddles.

Vertical head is equipped with three spindles and the rear horizontal head has a two-spindle auxiliary unit. Parts are hand-loaded, and the fixture lock-pin is operated by a foot treadle. When operating lever is tripped, machine performs a complete cycle and returns to starting position for indexing and loading new part. Production rate averages 400 complete pieces per hour.

Tool Is Both Vernier Caliper and Height Gage

■ George Scherr Co., 128 Lafayette street, New York, has placed on the market an improved Mauser precision tool, which may be used both as a vernier caliper and a height gage.

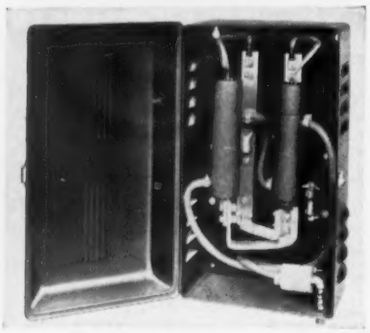
Improved feature is a combination quick-action cam lock and fine adjusting screw which permits easy setting to close limits of accuracy. Cam lock is

released by pressing fine adjusting screw until approximate measurement is obtained. Then, in order to secure fine measurements in thousandths of an inch, adjustment screw is turned while cam lock remains closed.

Known as model 407-R this instrument is 9 inches long, with a measuring capacity of 6¼ inches. It comes with an accurately lapped steel base and scriber, which are attached to the caliper jaws, thus transforming tool into a height gage. It has also two knife-edges which are useful for layout work for measuring distances between holes and for measuring root diameters of gears, threads, etc.

Controls Primary Circuit Of Welding Transformers

■ Westinghouse Electric & Mfg. Co., Pittsburgh, has devised an electronic power switch, known as the Weld-o-trol, for controlling the primary circuit of welding transformers in the welding of mild steel



products and other readily welded metals.

With either sealed-off or continuously pumped ignitron tubes, this unit offers an instantaneous power switch for producing uniform welds. It is free of moving parts, arcing contacts and noise. Available ratings are equivalent roughly to 300 and 600-ampere conventional welding contactors.

Unit consists of a sheet metal cabinet in which are mounted a bus bar assembly, electrical connections and either a flow switch or a pressure switch. Assembly is of same general construction for all tube ratings. Switch assembly, with sealed-off tubes, is available either open or enclosed.

Power Is Stepped Up on Improved Spray Painter

■ Gast Mfg. Corp., Bridgman, Mich., has placed on the market a Speed Boy model A spray painter with 1/3-horsepower motor, designed for painters who require more capacity than that furnished by the standard ¼-horsepower machine.

In addition to larger motor, this unit features a production size gun,

pressure feed cut with large opening and quick-clamp cover, rotary compressor, twin cooling fans and non-pulsating delivery of air without storage tank. It is claimed this machine is designed to operate continuously as a heavy duty unit and is built for a maximum of portability and economy.

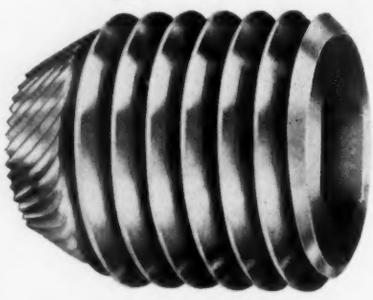
Safety Valve Developed For 2500-Pound Boilers

■ Consolidated Safety Valve division of Manning, Maxwell & Moore Inc., Bridgeport, Conn., has announced completion of a line of safety valves for pressures up to 2500 pounds at 1000 degrees Fahr.

Special alloy steels with low coefficients of expansion have been selected for bodies, bonnets, springs and trim so that these valves will provide same safe performance regularly produced by valves for 300-pound boilers. Bodies and bonnets are assembled with through bolts to prevent "freezing" at high temperatures. Trim is treated stainless steel. Constant seat diameter is insured by a bevel seat in which actual contact bearing between seat and disk is always at the lowest portion of seat surface. Single ring type blowdown control is used.

Knurled Edges of Set Screw Prevent Loosening

■ Standard Press Steel Co., Stewart avenue, Jenkintown, Pa., has placed on the market a new cup



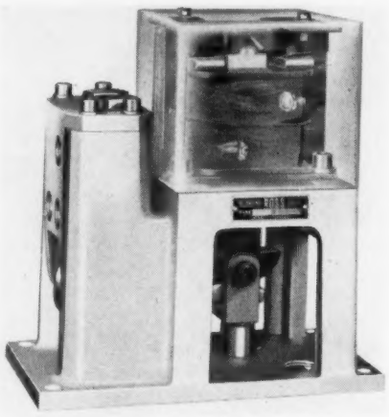
point set screw with knurling all around the points. When turned into place knurled edges grip the shaft in such a manner that loosening or backing-off is impossible except by application of a wrench.

It is possible to re-use these screws in the same holes indefinitely and secure an equal degree of effective self-locking protection for there is nothing that will harm the threads of the tapped holes. A wide range of sizes is available.

Air Valves Suitable For Welding Operations

■ Ross Operating Valve Co., 6487 Epworth boulevard, Detroit, has announced two new solenoid controlled air valves especially designed for high-speed service such as that required for numerous welding operations. One of these units is for control of single-acting and the other for control of double-acting cylinders.

Utilization of air line pressure for reversing valve action is an unusual feature. Elimination of return springs makes possible the use of smaller solenoids. The poppet prin-



ciple is employed in both of these models.

Simple, sturdy construction throughout, with easy access to all working parts, makes these valves especially adapted to production operations where serviceability together with rapid interchanging of parts is of major importance. Valves are made in ⅜-inch pipe size and are available in all standard current characteristics.

Drills Ice Tray Handles

■ Langelier Mfg. Co., Providence, R. I., has designed and built a horizontal duplex machine for drilling and counterboring two holes in ice tray handles, at rate of 750 pieces per hour.

Positive cam feed units are driven through V-belts from motors mounted in base of machine. Electrical controls are used to synchronize the two heads, and right hand head acts as control head, actuating automatic

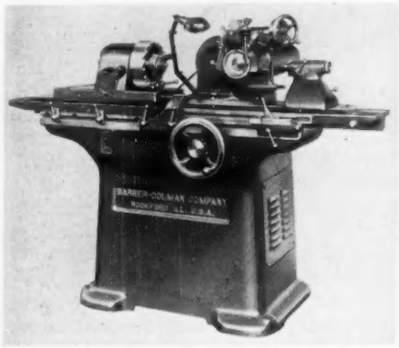
ADVERTISING PAGES REMOVED

clamping fixture. Parts are loaded by hand; the fixture clamps and ejects finished pieces automatically. A motor driven pump supplies lubricant to tools from a reservoir cast in the base.

Versatile Unit Sharpens Reamers, Hobs or Cutters

■ Barber-Colman Co., Rockford, Ill., has developed a versatile machine for sharpening reamers, hobs or cutters. In addition, several specialized grinding operations can be handled with greater speed and economy than formerly.

Following of spiral leads, indexing, diameter size, blade profile, feed to wheel on tooth face grinding, diameter cutting clearance, relief clearance, wheel dressing, radial faces on high spirals—all these sharpening factors are under posi-



tive mechanical control, and all mechanical movements of the machine can be duplicated accurately to assure uniformity of work on any number of pieces.

Sharpening system employed assures reamed holes that are truly round and straight, it is claimed, with smooth finish free from welts and diameter accuracy controllable to 0.0002-inch. In hob sharpening, it affords accuracy of index, tangent bar control of gash spiral, true radial faces even on high spiral hobs and positive feed control. Better than average accuracy is obtained also in the sharpening of milling cutters.

Car Puller Facilitates Loading and Unloading

■ Cullen-Friestedt Co., 1300 South Kilbourn avenue, Chicago, has introduced a line of electric capstan type car pullers, designed to facilitate switching and spotting of cars at loading and unloading points and pulling cars into and out of annealing ovens and core ovens.

Unit pulls from any direction and is useful in dragging heavy material along the ground. It can be applied

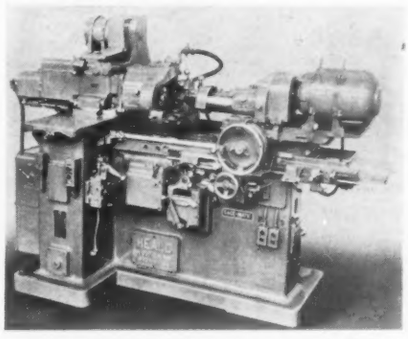
in manufacturing plants, quarries, coal yards, ship yards, docks, power plants, etc.

Puller is built in two sizes, the larger of which can be furnished with either a 7½ or 10-horsepower motor. Smaller model has a 5-horsepower motor. Pulls of 6000, 9000 and 12,000 pounds, respectively, are possible with these three types, and line speed is 45 feet per minute. Either wire rope or manila rope can be used with the capstan. Unit can be installed permanently on a concrete foundation, or it can be mounted on skids or a truck for portability. Car puller and motor are weatherproof and suitable for outdoor installation.

Two Grinding Operations Done at Single Setting

■ Heald Machine Co., Worcester, Mass., has designed a unit, known as No. 72A3 T-base grinding machine, for internal grinding and face grinding at the same setting. Machine is arranged to grind first the internal bore in a fully automatic cycle and at the same setting, without re-chucking, grind the adjacent external face in a plunge cut, using a separate cup wheel.

Two separate wheelheads for both



hole and face grinding are mounted on the wheelhead cross slide; the workhead is mounted on a hydraulic cross slide at end of machine in order to index work from hole grind to face grind; and the base has a T-section at the left end to support workhead cross slide. Both wheelheads are driven by a single motor from an idler pulley which drives the front head through multiple V-belts and the rear head by a flat belt.

Machine is easy to operate and requires minimum supervision. It is claimed one operator can handle two of these units.

Equipment Speeds Up Hollow Screw Fastening

■ J. H. Williams & Co., 75 Spring street, New York, has introduced a set of detachable supersockets for use with hollow-screws. This set, consisting of bits, parts and handles, is designed to replace the L-shape wrenches of hex bar steel and provide greater speed and convenience in driving hollow-screws.

Set AL-101 contains 19 pieces: 10 bits for handling hollow (hex

socket) set screws, ¼ to 1⅜-inch, and hollow cap screws, No. 8 to 1-inch; also 9 handles and parts, including 2 reversible "superratchet" handles and the new torque "Measurrench." The "Measurrench" provides an efficient tool for measuring right-hand turning torque and enables the operator to tighten hollow screws to the proper degree without danger of overload. Set is supplied in fitted steel case.

High-Speed Grinder Is Powerful for Its Size

■ Onsrud Machine Works Inc., 3900 Palmer street, Chicago, has placed on the market an air turbine grinder designed for continuous duty at 75,000 revolutions per minute.

Although it weighs only 12 ounces, this B-1 grinder has an actual rating of 1/6-horsepower. It is designed for rapid and smooth tool and die grinding and serves also as a marking tool for writing in all types of metals, plastics, glass, porcelain and other materials. Grinder operates with equal efficiency in any position. It may be mounted into a lathe tool post holder for internal grinding or held in place in a vise for tool resharpening.

Explains Processing of Stainless Steel Wire

(*Concluded from Page* 45)

pendent upon the following factors: Composition and size of stock, linear speed, maximum patenting temperature and temperature of the quenching medium, if it be either lead or salt. The speaker asserted that by change and control of one or more of these factors, the tensile strength particularly of the stock can be varied over a wide range.

Discussion brought out the following facts: Grain size No. 3 is best to work out mill control in the manufacture of rope wire. If a steel is coarse grained at 1800 degrees Fahr. a high-grade wire can be made if the quenching is regulated. A coarse-grained steel will produce a better rope wire than a steel of fine grain. Fine grain steels in rod form is not so important but under cold working they show a variation in grain growth. Steel with a long fiber structure gives better service in wire rope than do short fiber structures.

H. K. Hammerstein, chief engineer, Broderick & Bascom Rope Co., St. Louis, in speaking on "The Kind and Necessity of Tests for Rope Wire" stated that the general adoption of tungsten carbide for wire drawing dies has eliminated out-of-round, scratched, and tapered wire and has enabled the wire mills to produce wire in all sizes with a plus and minus tolerance that was formerly only possible in those sizes drawn with diamond dies.

The finished or surface condition of the wire also have been considerably improved. This, the speaker contended, has also contributed to greater tensile strength uniformity, and increased torsions, bends and elongations.

Mr. Hammerstein discussed various kind of tests to which rope wire is subjected and emphasized in conclusion that no single test will tell the complete story of wire quality. He asserted that all tests must be correlated, with consideration given as to what effect one characteristic has upon the others, and with due regard as to the significance of each test in reflecting the desired properties.

Heat Transfer

(*Concluded from Page* 41)

15,932 kilowatt hours more than for an equal tonnage during the previous three weeks. This difference, at 1.6c per kilowatt hour equals $254.81 or the cost of two new refractory sets. This power increase also accounted for 500 pounds of carbon electrodes or an additional $35, together making a total of $289.81.

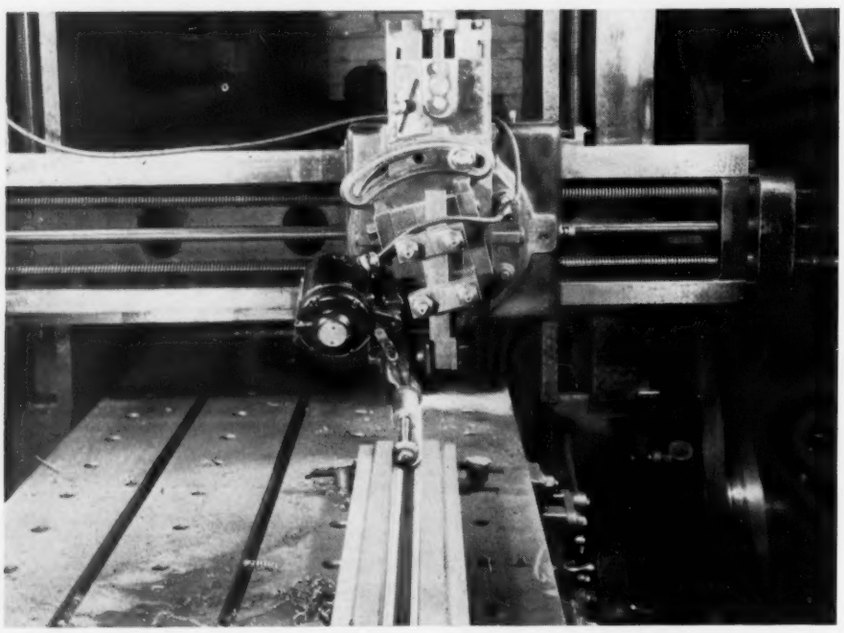
Ordinarily there were 40 heats per week of five days. The usual eight heats per day taking 16 to 18 hours. After the second run began, there was a jittery start for a few days, due to the newness of certain variables, principally the change to graphite electrodes. These heats were not representative and are therefore omitted. They showed, however, that the furnace was easier to overrun with graphite than with carbon electrodes, due to their lower unit resistance and their smaller cross section, 8 inches diameter instead of 12 inches.

As shown in Fig. 1, the comparison is made for a period of 105 heats. The heats of each curve have the same side wall number. The average for the upper curve A is 694 kilowatt hours per net ton and for the lower curve 647. These are for practically equal tonnages. The difference in kilowatt hours during this time was 15,400, or $246.40 more for electricity and $36.75 extra for electrodes, together $283.15. The time saved was only two and one half hours.

Besides the well known advantages of the graphite over the amorphous carbon, for this work, another one appeared. This was due to the method of adding the new piece. With the heavier 12-inch diameter carbon, it was the practice to pull out the entire electrode aggregate, after it became too short to function. It usually was 1½ lengths, or between 7 and 8 feet, with its temperature varying from white hot to black at the cold end. When this was replaced by the crane with a cold electrode aggregate of some 2½ lengths, the heat in the hot and removed length was lost. This lost heat had to be replaced by heating up the new aggregate.

With an average of 1025 degrees Cent. this amounts to just 100 kilowatt hours per heat, about 38 kilowatt hours per net ton, which showed up in higher figures in the next heat. This energy was saved in the new setup by adding the new graphite piece to the hot remainder while the latter was in the furnace, a very real saving.

Grinds Mold for Church Pew Tops



■ **Mounted in a George Gorton planer, this Dumore grinder with extension quill is being used to grind a mold for rubber church pew tops in shops of Nelson Bros. & Strom, Racine, Wis. Application is unusual because of necessity to maintain a true surface over 5-foot length of mold**

Skin Protects Surfaces

■ Designed to protect fine finishes during shipment and storage against chemical injury, a temporary "skin" that may be applied by spraying, brushing or dipping is being marketed under the name of Protex by American Anode Co., Akron, O. This coating has good adhesion, it is claimed, yet can be peeled off in one piece.

Recommended for application with a wide variety of products ranging from mirror finishes to sensitive fabrics, this protective agent preserves original quality of sheen, color and cleanliness.

Dishwashers

(*Concluded from Page* 44)

for 440-volt, 60-cycle, three phase combination is seen in place on the switchboard.

In use the operator simply selects the panel corresponding to the service he wants, places it over switchboard and plugs in connecting cables as shown by painted lines on the panel. This avoids confusion and possible errors and greatly increases the speed of handling test work where such a wide variety of service requirements are used.

After each dishwasher has been tested and operated with water, an inspector passes it to the finishing department. Dishwashers are painted in special spray booths and moved into an air-conditioned drying room. All assembly, testing and finishing work is done with the machine mounted on skids which are moved along on the roller type floor conveyor.

After painted machines have dried they are moved on the conveyor to the trim department where all fittings, knobs, nameplates, etc., are attached. Fig. 5 shows cleaning and polishing room through which the washers pass during finishing operations.

Fig. 6 shows a section of roller conveyor which is mounted on a lift in the spray booth. This makes it easy for the dishwasher to be raised to a convenient working level. After painting, lift simply is lowered to floor level where conveyor section lines up with other sections to permit easy transfer of the washer on down the line.

Upon completion of this work, dishwashers are packed still mounted on the original skids and sent down the conveyor to the shipping department where they either are shipped or placed in storage. Not only are finished machines stocked but also partially completed machines. With these partially completed machines it is only necessary to mount the proper motor and provide the proper method of heating the water before they are shipped.

German for Chemistry And Science Students

■ *German Grammar for Chemists and Science Students*, by John T. Fotos and John L. Bray; cloth, 323 pages, 5½ x 8 inches; published by John Wiley & Sons Inc., New York; supplied by STEEL, Cleveland, for $2.25; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London, S.W.1.

Recognizing need for a working knowledge of the German language in order to be able to read important scientific and technical articles and books without spending the time necessary for learning the entire language in the usual way, the authors, both on the faculty at Purdue university, experimented with a special course for technical students. The present volume is a result of this trial. It was used in mimeographed form by more than 500 students for two years with excellent results.

The usual method in teaching German puts the general student and the science and technology student in the same classes for the first one or two years. After this general preparation the latter are allowed to specialize along technical lines. Examinations of students of this course and of the traditional second-year chemical German course after a first-year literary course showed that 70 per cent of students having only one year of the new course satisfied all requirements of the second-year chemical German reading requirements.

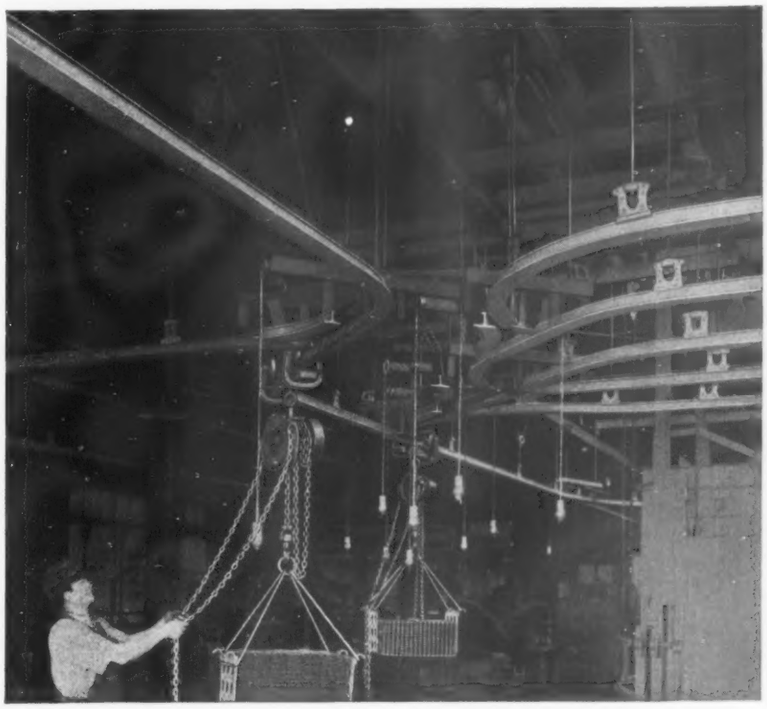
A German-English and English-German vocabulary covering the words used in science and technology offers easy access without necessity for hunting in a full dictionary.

CLEVELAND TRAMRAIL

MATERIALS HANDLING EQUIPMENT

Serving Every Industry

from light loads in the food and textile plants to heavy loads in the metal working industries.



• The heat treating department of a file manufacturer is well served by a Tramrail hand operated system. Switches to properly route the loads — Hand Propelled Carrier and chain hoist handling planned loads on racks designed for the purpose.

ALSO BUILDERS OF

CLEVELAND CRANES

FOR EVERY INDUSTRY

CLEVELAND TRAMRAIL

Division of

THE CLEVELAND CRANE & ENGINEERING CO.

1125 Depot St.

WICKLIFFE, OHIO

Or consult your phone directory under Cleveland Tramrail.

New Three-Dimensional X-Rays Aid Metal Study

■ X-rays have long been used to study metals for interior defects but because of two-dimensional limitations it has been difficult to determine exactly the depth of flaws from the surface of the metal.

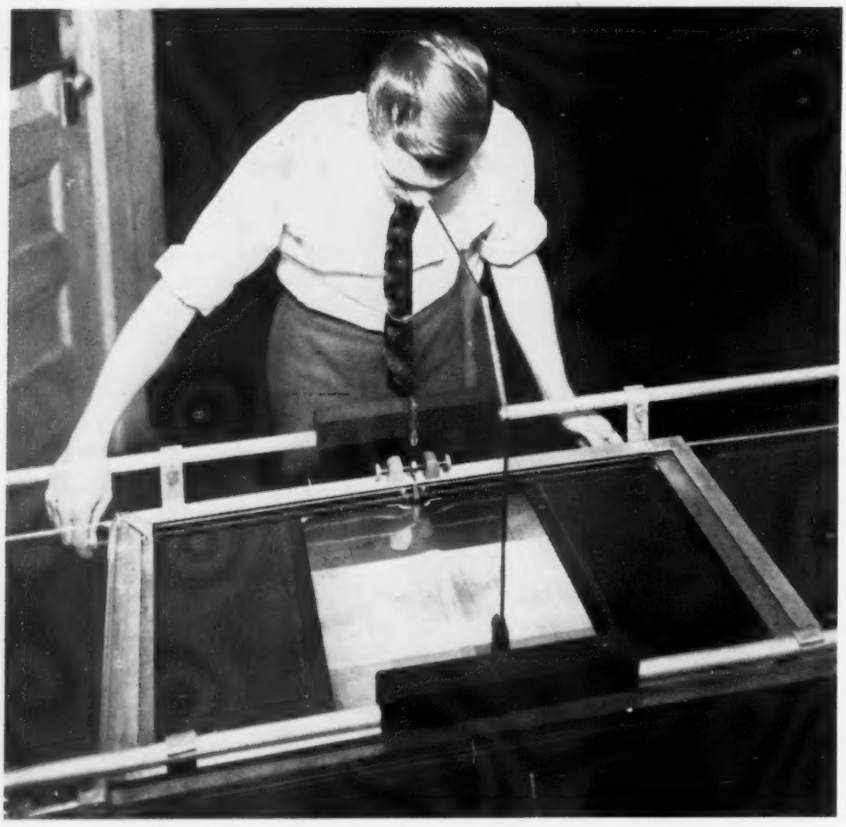
However, by use of an X-ray stereoscope and stereometer developed in laboratories of General Electric Co., Schenectady, N. Y., special X-ray views not only show an internal flaw but further indicate accurately its distance from the surface.

Its operation can be explained by a simple analogy. A photograph of a button in a block of ice would show the button but would not indicate its depth. However, a second photograph taken at an angle from the first would give you a means of comparison that would clearly indicate the depth of the button. Using the same principle, the second X-ray of the metal object is taken from a point five degrees from the first, the two X-ray pictures placed in a stereoscope merging them into one and showing depth relation of any flaws present.

To measure accurately the depth, a "ruler," consisting of two wires which are moved sidewise to make their image appear to approach or recede, are used. When adjusted to coincide with position of flaw, the distance from the surface is read on an accompanying scale. Operation is fast, simple and accurate.

Applications of this instrument include: Determination of the overall thickness of an object or of an internal part of an object; study of the relation of defects to one another or to either surface; determination of the amount of dip or rise in an extended defect.

X-ray stereoscope and stereometer developed by General Electric laboratories to indicate and measure depth of flaws in metal



Coercive Force Measures Carbon Content of Steel

(*Concluded from Page* 53)

tion of metallographic specimens which are too soft and contain too many nonmetallic inclusions to be prepared by customary methods. A description of the method was given by George A. Ellinger, associate metallurgist, and Joseph S. Acken, assistant science aide, of the bureau of standards.

Intermediate preparation of specimens is done on a grooved 50 per cent lead, 50 per cent tin disk in which emery has been embedded. V-shaped grooves arranged in a rectangular pattern serve to hold lubricants and to catch particles of dislodged emery.

According to Messrs. Ellinger and Acken, the method is rapid, efficient and provides specimens of considerable flatness for the finishing stage. Specimens are remarkably free from surface distortion, and inclusions of all types are retained without pitting or tearing out. The equipment was said to be inexpensive and the technique not difficult to acquire.

A method for automatic polishing of metallurgical specimens by use of cast iron and lead laps was described by Tracy C. Jarrett, assistant metallurgist, American Optical Co., Southbridge, Mass. Specimens polished by this method possess flatness, are free from metal flow and retain the inclusions.

The speaker pointed out that when a piece of metal is polished with a cloth lap there is a tendency for the metal to flow and this may obliterate the structure under examination. This is more pronounced in the case of soft metals, and when inclusions are the subject of examination they will often be torn loose from their parent metals.

In the method described by Mr. Jarrett, it appears from the results obtained that this tendency of the metal to flow and inclusions to be pulled out are lessened. This may be explained by the fact that there is a continuous grinding operation through all stages of grinding and polishing, so that in the end a "ground-polished" surface is the result. The speaker explained, however, that it is impossible to rid a specimen from all of its scratches. He said: "This, to some, may be a bad feature, but regardless of the few scratches remaining, it is possible to see the structure under examination very clearly."

Controlled Grain Size

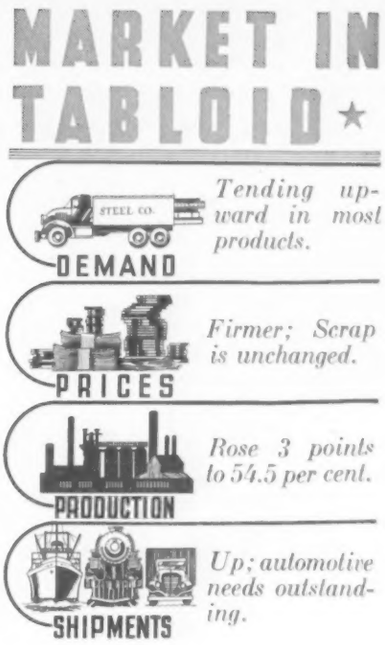
(*Concluded from Page* 37)

for use with hoists in handling the heavier sections. Working areas in the warehouse are covered by a number of tramrail bridges which operate over the entire floor area and which interlock into the ends of the aisle sections thus affording maximum ease in handling. Several types of cut-off saws are employed.

A code system of coloring is used to aid rapid identification of the various items, different colors indicating various analyses. The end of each bar is marked in the color code and in addition carries a stamped-in heat number for permanent identification and actual analysis data. The Cleveland warehouse is all on one floor of a building approximately 150 x 200 feet, with district offices on a mezzanine floor. Being near the lakefront and in the heart of the east side manufacturing district, it is readily accessible to railroad and truck line loading points.

Steel Sales, Output Resume Upward Trend

Substantial Backlogs Of Sheets, Strip Aid Operations



■ PACED by expanding needs of the automotive industry, steel demand shows more diversified improvement. Production has risen to a new 1938 peak at 54.5 per cent and for the first time this year is ahead of the rate for the corresponding 1937 period.

Retarding effect of recent price unsettlement on business in some products has been successfully removed by the introduction of a firmer market on sheets and strip. At the same time, heavy tonnages of flat-rolled steel, booked during the temporary period of cut prices, are reflected in rising production of this material.

With the best backlogs in many months and with shipment of low-price orders marked for completion before Jan. 1, sheet and strip producers are assured of sustained operations the remainder of the year. This tonnage is not expected to restrict operations next quarter, however, since many buyers covered no more than this quarter's requirements, some for a shorter period. Automotive interests are thought likely to find it necessary to re-enter the market before the end of the year.

While the bulge in flat-rolled steel business chiefly was responsible for pushing total October bookings to the best level so far this year, producers are encouraged by broad gains in demand for other products. Recent improvement in sales by warehouses attests to the diversification of the upturn in consumption by smaller steel users.

Freight Car and Locomotive Buying In Temporary Spurt

Railroad equipment buying has spurted, but in the absence of additional inquiries of consequence, the pick-up is expected to be short-lived. Southern railway has distributed orders for 2400 freight cars and 25 express cars, while the New York Central has placed 29 diesel switching locomotives. Kansas City terminal is inquiring for three diesel switchers. A moderate amount of rail buying is looked for the next 60 days, but the carriers generally continue to pursue cautious purchasing policies.

Pending and prospective shipwork will take substantial steel tonnages, and, along with building and engineering construction, offers the most promising outlet for heavy rolled products. Cargo boats to be placed by the United States maritime commission may involve nearly 100,000 tons, while plans are under way for three large liners requiring about 35,000 tons. Several battleships also are pending.

Public projects still dominate construction markets, but private interests are more active in the building of single and multiple-family dwellings. At Chicago, proposed housing projects of a private nature enhance the building outlook.

Automobile Production Reaches Best Rate For Year To Date

Automobile plants continue to speed operations, with a beneficial effect on steel suppliers. Motorcar assemblies last week touched a new 1938 high at 73,335 units, a gain of nearly 5000. General Motors accounted for 34,350 units, against 31,925 the week before. Chrysler's output rose from 15,000 to 16,750; Ford was practically unchanged at 12,875; while production by all others was 9360, compared with 8585 the preceding week.

Districts catering principally to the automotive industry largely were responsible for pushing the national steelmaking rate up 3 points to 54.5 per cent last week. At Cleveland, operations soared 10 points to 74 per cent. At Detroit, with some mills running at capacity, the rate rose 3 points to 82 per cent. Youngstown scored a 4-point gain to 61 per cent. Pittsburgh was up 3 points to 42 per cent, Chicago up 1.5 points to 46.5 per cent, Eastern Pennsylvania up 2 points to 34 per cent and Wheeling up 5 points to 59 per cent.

New England dropped 15 points to 55 per cent and St. Louis was off 2.5 points to 43. Unchanged districts were Buffalo at 49 per cent, Birmingham at 57 and Cincinnati at 70.

Scrap markets show a stronger undertone in view of the upturn in consumption, but prices are unchanged, and the scrap composite remains at $14.04. The finished steel composite also is steady at $57.20, while the iron and steel composite holds at $36.54.

COMPOSITE MARKET AVERAGES

	Oct. 29	Oct. 22	Oct. 15	One Month Ago Sept., 1938	Three Months Ago July, 1938	One Year Ago Oct., 1937	Five Years Ago Oct., 1933
Iron and Steel	$36.54	$36.54	$36.13	$36.48	$36.32	$39.59	$30.53
Finished Steel	57.20	57.20	56.40	57.20	57.20	61.70	49.20
Steelworks Scrap..	14.04	14.04	14.04	14.23	13.06	15.93	10.37

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	Oct. 29, 1938	Sept. 1938	July 1938	Oct. 1937
Steel bars, Pittsburgh	2.25c	2.25c	2.25c	2.45c
Steel bars, Chicago	2.25	2.25	2.25	2.50
Steel bars, Philadelphia	2.57	2.57	2.57	2.74
Iron bars, Terre Haute, Ind.	2.15	2.15	2.15	2.35
Shapes, Pittsburgh	2.10	2.10	2.10	2.25
Shapes, Philadelphia	2.215	2.215	2.215	2.455
Shapes, Chicago	2.10	2.10	2.10	2.30
Plates, Pittsburgh	2.10	2.10	2.10	2.25
Plates, Philadelphia	2.15	2.15	2.15	2.435
Plates, Chicago	2.10	2.10	2.10	2.30
Sheets, hot-rolled, Pittsburgh	2.15	2.15	2.15	2.40
Sheets, cold-rolled, Pittsburgh	3.20	3.20	3.20	3.55
Sheets, No. 24, galv., Pittsburgh	3.50	3.50	3.50	3.80
Sheets, hot-rolled, Gary	2.15	2.15	2.15	2.50
Sheets, cold-rolled, Gary	3.20	3.20	3.20	3.65
Sheets, No. 24, galv., Gary	3.50	3.50	3.50	3.90
Bright bess., basic wire, Pitts.	2.60	2.60	2.60	2.90
Tin plate, per base box, Pitts.	$5.35	$5.35	$5.35	$5.35
Wire nails, Pittsburgh	2.45	2.45	2.45	2.75

Semifinished Material

Sheet bars, open-hearth, Youngs.	$34.00	$34.00	$34.00	$37.00
Sheet bars, open-hearth, Pitts.	34.00	34.00	34.00	37.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	37.00
Wire rods, No. 5 to $\frac{9}{32}$-inch, Pitts.	43.00	43.00	43.00	47.00

Pig Iron

	Oct. 29, 1938	Sept. 1938	July 1938	Oct. 1937
Bessemer, del. Pittsburgh	$22.34	$21.34	$21.34	$25.26
Basic, Valley	20.50	19.50	19.50	23.50
Basic, eastern, del. Philadelphia	22.34	21.34	21.34	25.26
No. 2 foundry, Pittsburgh	22.21	21.21	21.21	25.21
No. 2 foundry, Chicago	21.00	20.00	20.00	24.00
Southern No. 2, Birmingham	17.38	16.38	16.38	20.38
Southern No. 2, del. Cincinnati	20.89	19.89	19.89	23.69
No. 2X, Del. Phila. (differ. av.)	23.215	22.215	22.215	26.135
Malleable, Valley	21.00	20.00	20.00	24.00
Malleable, Chicago	21.00	20.00	20.00	24.00
Lake Sup., charcoal, del. Chicago	28.34	28.34	28.34	30.04
Gray forge, del. Pittsburgh	21.17	20.17	20.17	24.17
Ferromanganese, del. Pittsburgh	97.77	97.77	97.77	107.29

Scrap

Heavy melting steel, Pittsburgh.	$14.75	$15.25	$13.75	$17.15
Heavy melt. steel, No. 2, E. Pa.	12.75	12.75	12.20	14.01
Heavy melting steel, Chicago	13.25	13.60	12.05	13.95
Rails for rolling, Chicago	16.25	17.75	17.05	17.25
Railroad steel specialties, Chicago	15.25	16.60	14.95	19.35

Coke

Connellsville, furnace, ovens	$ 3.75	$3.75	$3.75	$4.40
Connellsville, foundry, ovens	5.00	5.00	5.00	5.25
Chicago, by-product fdry., del.	10.50	10.50	10.80	11.00

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Except when otherwise designated, prices are base, f.o.b. cars.

Sheet Steel

Hot Rolled

Pittsburgh	2.15c
Chicago, Gary	2.15c
Cleveland	2.15c
Detroit, del.	2.25c
Buffalo	2.15c
Sparrows Point, Md.	2.15c
New York, del.	2.39c
Philadelphia, del.	2.32c
Granite City, Ill.	2.25c
Middletown, O.	2.15c
Youngstown, O.	2.15c
Birmingham	2.15c
Pacific Coast points	2.65c

Cold Rolled

Pittsburgh	3.20c
Chicago, Gary	3.20c
Buffalo	3.20c
Cleveland	3.20c
Detroit, delivered	3.30c
Philadelphia, del.	3.52c
New York, del.	3.54c
Granite City, Ill.	3.30c
Middletown, O.	3.20c
Youngstown, O.	3.20c
Pacific Coast points	3.80c

Galvanized No. 24

Pittsburgh	3.50c
Chicago, Gary	3.50c
Buffalo	3.50c
Sparrows Point, Md.	3.50c
Philadelphia, del.	3.67c
New York, delivered	3.74c
Birmingham	3.50c
Granite City, Ill.	3.60c
Middletown, O.	3.50c
Youngstown, O.	3.50c
Pacific Coast points	4.00c

Tin Mill Black Plate

Pittsburgh	3.15c
Chicago, Gary	3.15c
Granite City, Ill.	3.25c

Long Ternes No. 24 Unassorted

Pittsburgh, Gary	3.95c
Pacific Coast	4.65c

Enameling Sheets

	No. 10	No. 20
Pittsburgh	2.75c	3.35c
Chicago, Gary	2.75c	3.35c
Granite City, Ill.	2.85c	3.45c
Youngstown, O.	2.75c	3.35c
Cleveland	2.75c	3.35c
Middletown, O.	2.75c	3.35c
Pacific Coast	3.35c	3.95c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No. 304
Bars	24.00	25.00
Plates	27.00	29.00
Sheets	34.00	36.00
Hot strip	21.50	23.50
Cold strip	28.00	30.00

Straight Chromes

	No. 410	No. 430	No. 442	No. 446
Bars	18.50	19.00	22.50	27.50
Plates	21.50	22.00	25.50	30.50
Sheets	26.50	29.00	32.50	36.50
Hot strip	17.00	17.50	23.00	28.00
Cold stp.	22.00	22.50	28.50	36.50

Steel Plate

Pittsburgh	2.10c
New York, del.	2.29c
Philadelphia, del.	2.15c
Boston, delivered	2.42c
Buffalo, delivered	2.33c
Chicago or Gary	2.10c
Cleveland	2.10c
Birmingham	2.10c
Coatesville, base	2.10c
Sparrows Point, base	2.10c
Claymont, Del.	2.10c
Youngstown	2.10c
Gulf ports	2.45c
Pacific Coast points	2.60c

Steel Floor Plates

Chicago	3.35c
Gulf ports	3.70c
Pacific Coast ports	3.95c
Pittsburgh	3.35c

Standard Shapes

Pittsburgh	2.10c
Philadelphia, del.	2.21½c
New York, del.	2.27c
Boston, delivered	2.41c
Bethlehem	2.10c
Chicago	2.10c
Cleveland, del.	2.30c
Buffalo	2.10c
Gulf ports	2.45c
Birmingham	2.10c
St. Louis, del.	2.34c
Pacific Coast points	2.70c

Tin and Terne Plate

Tin Plate, Coke (base box)

Pittsburgh, Gary, Chicago	$5.35
Granite City, Ill.	5.45

Mfg. Terne Plate

Pittsburgh, Gary, Chgo.	4.65c
Granite City, Ill.	4.75c

Bars

Soft Steel

(Base, 3 to 25 tons)

Pittsburgh	2.25c
Chicago or Gary	2.25c
Duluth	2.35c
Birmingham	2.25c
Cleveland	2.25c
Buffalo	2.25c
Detroit, delivered	2.35c
Philadelphia, del.	2.57c
Boston, delivered	2.62c
New Cork, del.	2.59c
Gulf ports	2.60c
Pacific Coast points	2.85c

Rail Steel

To Manufacturing Trade

Pittsburgh	2.10c
Chicago or Gary	2.10c
Detroit, delivered	2.20c
Cleveland	2.10c

Buffalo	2.10c
Birmingham	2.10c
Gulf ports	2.45c
Pacific coast points	2.70c

Iron

Terre Haute, Ind.	2.15c
Chicago	2.15c
Philadelphia	2.47c
Pittsburgh, refined	3.50-8.00c

Reinforcing

New billet, straight lengths, quoted by distributors

Pittsburgh	2.05c
Chicago, Gary, Buffalo, Cleve., Birm., Young., Sparrows Pt.	2.05c
Detroit, delivered	2.15c
Gulf ports	2.40c
Pacific coast ports, f.o.b. car docks	2.50c
Philadelphia, del.	2.22c

Rail steel, straight lengths, quoted by distributors

Pittsburgh, Gary, Chicago, Buffalo, Cleveland, Birmingham	1.90c
Detroit, delivered	2.00c
Gulf ports	2.25c
Pacific Coast	2.35c

Wire Products

Pitts.-Cleve.-Chicago-Birm. base per 100 lb. keg in carloads

Standard wire nails	$2.45
Cement coated nails	$2.45

(Per pound)

Polished staples	3.15c
Galv. fence staples	3.40c
Barbed wire, galv.	3.20c
Annealed fence wire	2.95c
Galv. fence wire	3.35c
Woven wire fencing (base C. L. column)	67.00
Single loop bale ties, (base C. L. column)	56.00

To Manufacturing Trade

Base, Pitts. - Cleve. - Chicago-Birmingham (except spring wire)

Bright bess., basic wire	2.60c
Galvanized wire	2.65c
Spring wire	3.20c

Worcester, Mass., $2 higher on bright basic and spring wire.

Cut nails, C. L. Pitts. (10% disc. on all extras)	$3.60

Cold-Finished Bars

	Carbon	Alloy
Pittsburgh	2.70c	3.40c
Chicago	2.70c	3.40c
Gary, Ind.	2.70c	3.40c
Detroit	2.75c	*3.50c
Cleveland	2.70c	3.40c
Buffalo	2.70c	3.40c

* Delivered.

Alloy Bars (Hot)

(Base, 3 to 25 tons)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem	2.80c
Detroit, delivered	2.90c

S.A.E.	Alloy Diff.	S.A.E.	Alloy Diff.
2000	0.35	3100	0.70
2100	0.75	3200	1.35
2300	1.55	3300	3.80
2500	2.25	3400	3.20
4100	0.15 to 0.25	Mo.	0.55
4600	0.20 to 0.30	Mo. 1.50-2.00 Ni.	1.10
5100	0.80-1.10	Cr.	0.45
5100	Cr. spring flats		0.15
6100	bars		1.20
6100	spring flats		0.85
Cr. N., Van.			1.50
Carbon Van.			0.85
9200	spring flats		0.15
9200	spring rounds, squares		0.40

Electric furnace up 50 cents.

Piling

Pittsburgh	2.40c
Chicago, Buffalo	2.40c
Gulf ports	2.75c

Strip and Hoops

(Base, hot-rolled, 1 to 25 tons; cold-rolled, 3 to 25 tons)

Hot strip to 23/8-in.

Pittsburgh, Chicago, Gary, Cleveland Youngstown, Middletown, Birmingham	2.15c
Detroit, del.	2.25c
Philadelphia, del.	2.47c
New York, del.	2.51c
Cooperage hoop, Youngs., Pitts., Chicago, Birm.	2.25c
Cold strip, 0.25 carbon and under, Pittsburgh, Cleveland, Youngstown	2.95c
Chicago	3.05c
Detroit, del.	3.05c
Worcester, Mass.	3.15c

Carbon	Cleve. Pitts.
0.26—0.50	2.95c
0.51—0.75	4.30c
0.76—1.00	6.15c
Over 1.00	8.35c

Worcester, Mass., $4 higher.

Commodity Cold-Rolled Strip	
Pitts.-Cleve.-Youngstown	3.10c
Detroit, del.	3.20c
Worcester, Mass.	3.50c

Lamp stock up 10 cents.

Rails, Fastenings

(Gross Tons)

Standard rails, mill	$40.00
Relay rails, Pittsburgh 20—100 lbs.	32.50-35.50
Light rails, billet qual., Pitts., Chicago, B'ham.	$40.00
Do., rerolling quality	39.00
Angle bars, billet, mills	2.70c
Do., axle steel	2.35c
Spikes, R. R. base	3.00c
Track bolts, base	4.15c
Car axles forged, Pitts., Chgo., B'ham.	3.15c
Tie plates, base	$43.00

Base, light rails 25 to 60 lbs.; 20 lbs. up $2; 16 lbs. up $4; 12 lbs. up $8; 8 lbs. up $10. Base railroad spikes 200 kegs or more; base plates 20 tons.

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade as per Dec. 1, 1932, lists, carloads 5% up; full containers additional 10%.

Carriage and Machine

½ x 6 and smaller	65-5-5 off
Do. larger, to 1-in.	60-10-5 off
Do. 1⅛ and larger	60-5-5 off
Tire bolts	50-5 off

Stove Bolts

In packages with nuts attached 75 off; in packages with nuts separate 75-12½ off; bulk 85 off on 15,000 of 3-inch and shorter, or 5000 over 3-inch.

Step bolts	50-10-5-5 off
Elevator bolts	50-10-5-5 off
Plow bolts	65-5-5 off

Nuts

Semifinished hex. U.S.S.	S.A.E.
¼-⅞-in., incl.	65-10 70-5
½-⅞-in., incl.	65-5 70
⅝-1-in., incl.	60-10 65
1⅛ and larger	60-5 60-5

Hexagon Cap Screws

Milled	50-10-5 off
Upset, 1-in. smaller	67½-10 off

Square Head Set Screws

Upset, 1-in., smaller	75-10 off
Headless set screws	70-10 off

Rivets, Washers

Structural, Pittsburgh, Cleveland	3.40c
Structural, Chicago	3.40c
⅞-inch and smaller, Pitts., Chi., Cleve.	65-10 off
Wrought washers, Pitts., Chi., Phila., to jobbers and large nut, bolt mfrs. l.c.l. $5.40; c.l. $5.75	off
Do., less carloads, 5 kegs or more, no discount on any extras	$3.90
Do., under 5 kegs no disc. on any extras	$4.05

Welded Iron, Steel Pipe

Base discounts on steel pipe. Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less. Chicago, del. 2½ less. Wrought pipe, Pittsburgh.

Butt Weld

Steel

In.	Blk.	Galv.
½	63½	54
¾	66½	58
1—3	68½	60½

Iron

¾	30	13
1—1¼	34	19
1½	38	21½
2	37½	21

Lap Weld

Steel

2	61	52½
2½—3	64	55½
3½—6	66	57½
7 and 8	65	55½
9 and 10	64½	55
11 and 12	63½	54

Iron

2	30½	15
2½—3½	31½	17½
4	33½	21
4½—8	32½	20
9—12	28½	15

Line Pipe

Steel

1 to 3, butt weld	67½
2, lap weld	60
2½ to 3, lap weld	63
3½ to 6, lap weld	65
7 and 8, lap weld	64
10-inch lap weld	63½
12-inch, lap weld	62½

Iron

	Blk.	Galv.
¾ butt weld	25	7
1 and 1¼ butt weld	29	13
1½ butt weld	33	15½
2 butt weld	32½	15
1½ lap weld	23½	7
2 lap weld	25½	9
2½ to 3½ lap weld	26½	11½
4 lap weld	28½	15
4½ to 8 lap weld	27½	14
9 to 12 lap weld	23½	9

Boiler Tubes

Carloads minimum wall seamless steel boiler tubes, cut lengths 4 to 24 feet, f.o.b. Pittsburgh, base price per 100 feet subject to usual extras.

Lap Welded

Sizes	Gage	Steel	Charcoal Iron
1½" O. D.	13	$ 9.72	$23.71
1¾" O. D.	13	11.06	22.93
2" O. D.	13	12.38	19.35
2¼" O. D.	13	13.79	21.68
2¼" O. D.	12	15.16	.....
2½" O. D.	12	16.58	26.57
2¾" O. D.	12	17.54	29.00
3" O. D.	12	18.35	31.36
3½" O. D.	11	23.15	39.81
4" O. D.	10	28.66	49.90
5" O. D.	9	44.25	73.93
6" O. D.	7	68.14	.....

Seamless

Sizes	Gage	Hot Rolled	Cold Drawn
1" O. D.	13	$ 7.82	$ 9.01
1¼" O. D.	13	9.26	10.67
1½" O. D.	13	10.23	11.79
1¾" O. D.	13	11.64	13.42
2" O. D.	13	13.04	15.03
2¼" O. D.	13	14.54	16.76
2¼" O. D.	12	16.01	18.45
2½" O. D.	12	17.54	20.21
2¾" O. D.	12	18.59	21.42
3" O. D.	12	19.50	22.48
3½" O. D.	11	24.62	28.37
4" O. D.	10	30.54	35.20
4½" O. D.	10	37.35	43.04
5" O. D.	9	46.87	54.01
6" O. D.	7	71.96	82.93

Cast Iron Pipe

Class B Pipe—Per Net Ton

6-in., & over, Birm.	$42.00-43.00
4-in., Birmingham	45.00-46.00
4-in., Chicago	53.80-54.80
6-in. & over, Chicago	50.80-51.80
6-in. & over, east fdy.	46.00
Do., 4-in.	49.00

Class A Pipe $3 over Class B Stnd. fitgs., Birm., base $100.00

Semifinished Steel

Rerolling Billets, Slabs

(Gross Tons)

Pittsburgh, Chicago, Gary, Clev., Buffalo, Young., Birm., Sparrows Point	$34.00
Duluth (billets)	36.00
Detroit, delivered	36.00

Forging Quality Billets

6 x 6 to 9 x 9-in., base

Pitts., Chicago, Buffalo	40.00
Duluth	42.00

Sheet Bars

Pitts., Cleveland, Young., Sparrows Point, Buffalo, Canton, Chicago	34.00
Detroit, delivered	36.00

Wire Rods

Pitts., Cleveland, Chicago, Birmingham No. 5 to 9/32-inch incl.	43.00
Do., over 9/32 to 11/64-in. incl.	48.00

Worcester up $2; Galveston up $6; Pacific Coast up $9.

Skelp

Pitts., Chi., Young., Buff., Coatesville, Sparrows Pt.	1.90c

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur.	$3.75
Connellsville, fdry.	4.75- 5.50
Connell. prem. fdry.	5.75- 6.25
New River fdry.	6.50- 6.75
Wise county fdry.	5.50- 5.75
Wise county fur.	4.50- 4.75

By-Product Foundry

Newark, N. J., del.	10.88-11.35
Chi., ov., outside del.	9.75
Chicago, del.	10.50
Milwaukee, ovens	10.50
New England, del.	12.50
St. Louis, del.	11.00-11.50
Birmingham, ovens	7.00
Indianapolis, del.	10.00
Cincinnati, del.	9.75
Cleveland, del.	10.30
Buffalo, del.	10.50
Detroit, del.	10.25
Philadelphia, del.	10.65

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol	16.00c
Toluol, two degree	22.00c
Solvent naphtha	26.00c
Industrial xylol	26.00c

Per lb. f.o.b. Frankford and St. Louis

Phenol (200 lb. drums)	16.25c
Do. (450 lbs.)	15.25c

Eastern Plants, per lb.

Naphthalene flakes, balls, bbls. to jobbers	5.75c

Per ton, bulk, f.o.b. port

Sulphate of ammonia	$27.25

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25 sil.; 50c diff. below 1.75 sil. Gross tons.

Basing Points:	No. 2 Fdry.	Malle-able	Basic	Besse-mer
Bethlehem, Pa.	$22.00	$22.50	$21.50	$23.00
Birdsboro, Pa.	22.00	22.50	21.50	23.00
Birmingham, Ala.‡	17.38	.....	16.38	22.00
Buffalo	21.00	21.50	20.00	22.00
Chicago	21.00	21.00	20.50	21.50
Cleveland	21.00	21.00	20.50	21.50
Detroit	21.00	21.00	20.50	21.50
Duluth	21.50	21.50	.....	22.00
Erie, Pa.	21.00	21.50	20.50	22.00
Everett, Mass.	22.75	23.25	22.25	23.75
Granite City, Ill.	21.00	21.00	20.50	21.50
Hamilton, O.	21.00	21.00	20.50	.....
Neville Island, Pa.	21.00	21.00	20.50	21.50
Provo, Utah	19.00	.....	.....	.....
Sharpsville, Pa.	21.00	21.00	20.50	21.50
Sparrow's Point, Md.	22.00	.....	21.50	.....
Swedeland, Pa.	22.00	22.50	21.50	23.00
Toledo, O.	21.00	21.00	20.50	21.50
Youngstown, O.	21.00	21.00	20.50	21.50

‡Subject to 38 cents deduction for 0.70 per cent phosphorus or higher.

Delivered from Basing Points:

Akron, O., from Cleveland	22.39	22.39	21.89	22.89
Baltimore from Birmingham	22.78	.....	21.66	.....
Boston from Birmingham	22.87	.....	.....	.....
Boston from Everett, Mass.	23.25	23.75	22.75	24.25
Boston from Buffalo	23.25	23.75	22.75	24.25
Brooklyn, N. Y., from Bethlehem	24.50	25.00	.....	.....
Canton, O., from Cleveland	22.39	22.39	21.89	22.89
Chicago from Birmingham	†21.22	.....	.....	.....
Cincinnati from Hamilton, O.	21.44	22.11	21.61	.....
Cincinnati from Birmingham	21.06	.....	20.06	.....
Cleveland from Birmingham	21.32	.....	20.82	.....
Mansfield, O., from Toledo, O.	22.94	22.94	22.44	22.44
Milwaukee from Chicago	22.10	22.10	21.60	22.60
Muskegon, Mich., from Chicago, Toledo or Detroit	24.19	24.19	23.69	24.69
Newark, N. J., from Birmingham	23.15	.....	.....	.....
Newark, N. J., from Bethlehem	23.53	24.03	.....	.....
Philadelphia from Birmingham	22.46	.....	21.96	.....
Philadelphia from Swedeland, Pa.	22.84	23.34	22.34	.....
Pittsburgh district from Neville Island	Neville base, plus 69c, 84c, and $1.24 freight.			
Saginaw, Mich., from Detroit	23.45	23.45	22.95	22.95
St. Louis, northern	21.50	21.50	21.00	.....
St. Louis from Birmingham	†21.12	.....	20.62	.....
St. Paul from Duluth	23.63	23.63	.....	24.13

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Standish, N. Y., $26.50, Phil, base, standard and copper bearing, $27.63.

Gray Forge		Charcoal	
Valley furnace	$20.50	Lake Superior fur.	$25.00
Pitts. dist. fur.	20.50	do., del. Chicago	28.34
		Lyles, Tenn.	23.50

Silvery†

Jackson count, O., base: 6-6.50 per cent $25.50; 6.51-7—$26.00; 7-7.50—$26.50; 7.51-8—$27.00; 8-8.50—$27.50; 8.51-9—$28.00; 9-9.50—$28.50; Buffalo $1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base: Prices are the same as for silveries, plus $1 a ton.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon, 2 to 3%, $1 per ton add. Each unit over 3%, add $1 per ton.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$60.80

First Quality

Pa., Ill., Md., Mo., Ky.	47.50
Alabama, Georgia	47.50
New Jersey	52.50

Second Quality

Pa., Ill., Ky., Md., Mo.	42.75
Georgia, Alabama	34.20
New Jersey	49.00

Ohio

First quality	39.90
Intermediate	36.10
Second quality	31.35

Malleable Bung Brick

All bases	$56.05

Silica Brick

Pennsylvania	$47.50
Joliet, E. Chicago	56.05
Birmingham, Ala.	47.50

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	$28.00
Wire cut	$26.00

Magnesite

Imported dead - burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	$45.00
Do. domestic	40.00
Do., f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00
Quickset magnesite grains, f.o.b. Chewelah, Wash., net ton, bulk	22.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$47.00
Chem. bonded chrome	47.00
Magnesite brick	67.00
Chem. bonded magnesite	57.00

Fluorspar, 85-5

Washed gravel, duty paid, tide, net ton	$23.50-24.00
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail $20, barge	$22.00
No. 2 lump	22.00-23.00

Ferroalloy Prices

Ferromanganese, 78-82%, tidewater, duty pd. $92.50
Do., del. Pittsburgh 97.77

Spiegeleisen, 19-21% dom. Palmerton, Pa., spot 28.00
Do., New Orleans 28.00
Do., 26-28%, Palmerton 33.00

Ferrosilicon, 50% freight allowed, c.l. 69.50
Do., ton lot 80.50
Do., 75 per cent 126.00
Spot, $5 a ton higher.

Silicoman, 2½ carbon 97.75
2% carbon 102.75 1% 112.75
Contract ton price $11 higher; spot $5 over contract.

Ferrotungsten, stand., lb. con. del. cars 1.60-1.65

Ferrovanadium, 35 to 40%, lb., cont. 2.70-2.80

Ferrophosphorus, gr. ton, c.l., 17-18% Rockdale, Tenn., basis, 18%, $3 unitage, 58.50; electrolytic, per ton, c. l., 23-26% f.o.b. Monsanto, Tenn., 24% $3 unitage 75.00

Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb. del. carlots 10.50c
Do., ton lots 11.25c
Do., less-ton lots 11.50c

67-72% carloads, 2% carbon, per lb. contained chrome 16.50c
Do., ton lots 17.25c
Do., less-ton lots 17.50c

	Carloads	Ton lots	Less ton
2% carb.	16.50c	17.25c	17.50c
1% carb.	17.50c	18.25c	18.50c
0.10% carb.	18.50c	19.25c	19.50c
0.20% carb.	19.50c	20.25c	20.50c

Spot ¼c higher

Ferromolybdenum, 55-65% molyb. cont., f.o.b. mill, lb. 0.95

Calcium molybdate, lb. molyb. cont., f.o.b. mill 0.80

Ferrotitanium, 40%, lb. con. ti., ton lots $1.23
Do., less-ton lots 1.25
20-25% carbon, 0.10 max., ton lots, lb. 1.35
Do, less-ton lots 1.40
Spot 5c higher

Ferrocolumbium, 50-55%, contract, lb. con. col., f.o.b. Niagara Falls $2.25
Do, less-ton lots 2.30
Spot is 10c higher

Technical molybdenum trioxide, 53 to 60% molybdenum, lb. molyb. cont., f.o.b. mill 0.80

Ferro-carbon-titanium, 15-18%, ti., 6-8% carb., carlots, contr., net ton $142.50
Do, spot 145.00
Do, contract, ton lots 145.00
Do, spot, ton lots 150.00

15-18% ti., 3-5% carbon, carlots, contr., net ton 157.50
Do, spot 160.00
Do, contract, ton lots 160.00
Do, spot, ton lots 165.00

Alsifer, contract carlots, f.o.b. Niagara Falls, lb. 7.50c
Do, ton lots 8.00c
Do, less-ton lots 8.50c
Spot ½c lb. higher

Chromium Briquets, contract carloads, freight allowed, lb. 7.25c
Do, spot carlots, bulk 7.50c
Do, ton lots 8.00c
Do, less-ton lots 8.50c

Tungsten Metal Powder, according to grade, spot shipment, 200-lb. drum lots, lb. $2.05
Do, smaller lots 2.15

Vanadium Pentoxide, contract, lb. contained $1.10
Do, spot 1.15

Chromium Metal, 98% cr., 0.50 carbon max., contract, lb. con. chrome 80.00c
Do, spot 85.00c

88% chrome, contract 79.00c
Do, spot 84.00c

Silicon Metal, 1% iron, contract, lb. 14.50c
Do, 2% 13.00c
Spot ¼c higher

Silicon Briquets, contract, carloads, freight allowed, ton $69.50
Carload, spot 74.50
Less-ton lots, lb. 3.75c

Manganese Briquets, contract carloads, freight allowed lb. 4.75c
Ton lots 5.25c
Less-ton lots 5.50c
Spot ¼c higher

Zirconium Alloy, 12-15%, carloads, gross ton $97.50
Do, spot 102.50

34-40%, contract, carloads, lb., alloy 14.00c
Do, ton lots 15.00c
Do, less-ton lots 16.00c
Spot ¼c higher

Molybdenum Powder, 99%, f.o.b. York, Pa. 200-lb. kegs, lb. $2.60
Do, 100-200 lb. lots 2.75
Do, under 100-lb. lots 3.00

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials

	Soft Bars	Bands	Hoops	Plates ¼-in. & Over	Structural Shapes	Floor Plates	Sheets: Hot Rolled	Sheets: Cold Rolled	Sheets: Galv. No. 24
Boston	3.98	4.21	5.21	3.85	3.85	5.66	3.86	4.93	4.76
New York (Metropolitan)	3.94	4.11	4.11	3.76	3.75	5.56	3.73	4.90	4.40
Philadelphia	3.60	3.60	4.10	3.40	3.40	5.00	3.40	....	4.50
Baltimore	3.80	3.95	4.35	3.65	3.65	5.00	3.70	5.05	4.30
Norfolk, Va.	4.00	4.15	4.55	3.85	3.85	5.20	3.90	4.80	5.40
Buffalo	3.60	3.97	3.97	3.77	3.55	5.40	3.50	4.55	4.40
Pittsburgh	3.60	3.75	3.75	3.55	3.55	5.15	3.50	4.60	4.50
Cleveland	3.50	3.65	3.65	3.55	3.73	5.33	3.50	4.70	4.62
Detroit	3.68	3.83	3.83	3.75	3.80	5.42	3.58	4.65	4.74
Cincinnati	3.85	3.82	3.82	3.80	3.83	5.43	3.57	....	4.57
Chicago	3.60	3.75	3.75	3.55	3.55	5.15	3.50	4.45	4.50
Minneapolis	3.85	4.00	4.00	3.80	3.80	5.40	3.75	5.10	4.75
Milwaukee	3.73	3.88	3.88	3.68	3.68	5.28	3.63	4.58	4.63
St. Louis	3.87	4.02	4.02	3.82	3.82	5.42	3.77	4.72	4.77
Kansas City	4.15	4.30	4.30	4.10	4.10	5.70	4.10	....	4.75
Memphis	4.01	4.16	4.16	3.96	3.96	5.71	3.91	....	5.26
Chattanooga	3.90	4.05	4.05	3.85	3.85	5.80	3.80	....	4.40
Tulsa, Okla.	4.64	4.79	4.79	4.59	4.59	6.19	4.54	....	5.54
Birmingham, Ala.	3.50	3.65	3.65	3.45	3.45	5.83	3.40	....	4.75
New Orleans	4.10	4.65	4.65	4.00	4.00	5.95	4.25	....	5.15
Houston, Tex.	3.50	5.85	6.25	4.05	4.05	5.65	4.20	....	5.25
Seattle	4.30	4.50	5.85	4.05	4.15	5.90	4.20	....	5.50
Portland, Oreg.	4.30	4.70	6.10	4.15	4.15	5.90	3.75	6.50	4.75
Los Angeles	4.00	4.50	6.35	4.00	4.00	6.20	4.20	6.30	5.05
San Francisco	4.05	4.25	6.00	3.85	3.95	5.45	3.80	6.20	5.15

	Cold Rolled Strip	Cold Finished Bars	SAE Hot-rolled Bars (Unannealed): 1035-1050	2300 Series	3100 Series	4100 Series	6100 Series	SAE Cold Drawn Bars: 2300	3100
Boston	3.61	4.43	4.28	7.65	6.25	6.00	8.05	8.73	7.33
New York	3.66	4.39	4.14	7.50	6.10	5.85	....	8.69	7.29
Philadelphia	3.66	4.36	3.85	7.46	6.06	5.81	8.71	....	....
Baltimore	....	4.35	3.95	....	....	....	....	....	....
Norfolk, Va.	....	4.60	....	....	....	....	....	....	....
Buffalo	3.57	4.05	3.80	7.25	5.85	5.60	7.65	8.25	6.85
Pittsburgh	3.35	3.95	3.80	7.35	5.95	5.70	7.75	8.35	6.95
Cleveland	3.35	4.05	3.70	7.45	6.05	6.05	7.85	8.25	6.85
Detroit	3.55	4.10	3.83	7.57	6.17	5.92	7.39	8.55	7.15
Cincinnati	3.60	4.30	3.90	7.59	6.19	5.94	8.99	8.60	7.20
Chicago	3.65	4.05	3.80	7.25	5.85	5.60	7.65	8.25	6.85
Minneapolis	....	4.64	4.00	7.60	6.20	8.79	9.34	8.94	7.54
Milwaukee	....	4.18	3.93	7.48	6.08	5.83	7.88	8.48	7.08
St. Louis	3.76	4.32	4.07	7.62	6.22	5.97	8.02	8.62	7.22
Kansas City	4.46	4.60	....	....	....	....	....	....	....
Memphis	....	4.61	....	....	....	....	....	....	....
Chattanooga	....	4.90	....	....	....	....	....	....	....
Tulsa, Okla.	....	5.09	....	....	....	....	....	....	....
Birmingham, Ala.	....	4.73	....	....	....	....	....	....	....
New Orleans	5.00	5.10	....	....	....	....	....	....	....
Seattle	....	5.60	5.65	....	7.80	7.65	8.45	....	....
Portland, Oreg.	....	5.60	6.10	9.00	8.00	7.85	8.70	....	....
Los Angeles	4.45	6.60	4.65	9.40	8.55	8.40	9.05	10.40	9.55
San Francisco	*9.30	6.55	5.20	9.65	8.80	8.65	9.30	10.65	9.80

* Based on minimum quantity.

CURRENT IRON AND STEEL PRICES OF EUROPE

Dollars at Rates of Exchange, Oct. 27

Export Prices f. o. b. Port of Dispatch—

By Cable or Radio

	British gross tons U. K. ports £ s d	Continental Channel or North Sea ports, gross tons: Quoted in dollars at current value	**Quoted in gold pounds sterling £ s d
Foundry, 2.50-3.00 Si.	$26.18 5 10 0	$17.18	2 1 0
Basic bessemer	....	18.65	2 4 6
Hematite, Phos. .03-.05	30.94 6 10 0*	.....	.....
Billets	$37.49 7 17 6	$39.82	4 15 0
Wire rods, No. 5 gage	53.67 11 5 6	42.95	5 2 6
Standard rails	$48.20 10 2 6	$48.19	5 15 0
Merchant bars	2.33c 11 0 0	1.95c to 2.00c	5 2 6 to 5 5 0
Structural shapes	2.25c 10 12 6	1.85c	4 17 6
Plates, †¼ in. or 5 mm.	2.45c 11 11 3	2.14c to 2.33c	5 12 6 to 6 2 6
Sheets, black, 24 gage or 0.5 mm.	2.76c 13 0 0	2.90c	7 12 6°
Sheets, gal., 24 ga., corr.	3.34c 15 15 0	3.42c	9 0 0
Bands and strips	2.81c 13 5 0	2.19c	5 15 0
Plain wire, base	4.13c 19 10 0	2.33c to 2.76c	6 2 6 to 7 5 0
Galvanized wire, base	4.93c 23 5 0	2.99c to 3.09c	7 17 6 to 8 2 6
Wire nails, base	3.92c 18 10 0	2.66c to 2.85c	7 0 0 to 7 10 0
Tin plate, box 108 lbs.	$ 5.06 1 0 3	.....	.....

British ferromanganese $92.50 delivered Atlantic seaboard duty-paid.

Domestic Prices at Works or Furnace—

Last Reported

	£ s d	French Francs		Belgian Francs		Reich Mark
Fdy. pig iron, Si.2.5	$25.94 5 9 0(a)	$15.91	598	$16.90	500	$25.24 63
Basic bess. pig iron	23.80 5 0 0(a)	.....	.....	.....	...	27.84 (b) 69.50
Furnace coke	6.55 1 7 6	5.45	205	7.27	215	7.61 19
Billets	37.49 7 17 6	22.34	840	29.07	860	38.66 96.50
Standard rails	2.15c 10 2 6	1.38c	1,150	2.06c	1,375	2.38c 132
Merchant bars	2.59c 12 4 0††	1.30c	1,080	1.65c	1,100	1.93c 110
Structural shapes	2.34c 11 0 6††	1.27c	1,055	1.65c	1,100	1.93c 107
Plates, †¼-in. or 5 mm.	2.48c 11 14 3††	1.62c	1,350	2.06c	1,375	2.29c 127
Sheets, black	3.34c 15 15 0§	1.92c	1,600‡	2.36c	1,575‡	2.59c 144‡
Sheets, galv., corr., 24 ga. or 0.5 mm.	3.92c 18 10 0	2.70c	2,250	4.13c	2,750	6.66c 370
Plain wire	4.13c 19 10 0	1.98c	1,650	2.48c	1,650	3.11c 173
Bands and strips	2.74c 12 19 0††	1.45c	1,210	1.95c	1,300	2.29c 127

*Basic. †British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continent usually for basic-bessemer steel (a) del. Middlesbrough. 5s rebate to approved customers. (b) hematite. °Close annealed. ††Rebate of 15s on certain conditions.

**Gold pound sterling carries a premium of 72 per cent over paper sterling.

IRON AND STEEL SCRAP PRICES

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated; † indicates brokers prices

HEAVY MELTING STEEL

Birmingham, No. 1.	†11.00
Bos. dock No. 1 exp.	13.00-13.25
New Eng. del. No. 1	13.00
Buffalo, No. 1	14.00-14.50
Buffalo, No. 2	12.00-12.50
Chicago, No. 1	13.00-13.50
Chicago, auto, no alloy	11.00-11.50
Chicago, No. 2 auto	10.00-10.50
Cincinnati, dealers	11.25-11.75
Cleveland, No. 1	13.50-14.00
Cleveland, No. 2	12.50-13.00
Detroit, No. 1	9.50-10.00
Detroit (industrial)	10.75-11.25
Eastern Pa., No. 1	14.50-15.00
Eastern Pa., No. 2	12.50-13.00
Federal, Ill.	12.00-12.50
Granite City, R. R.	13.00-13.50
Granite City, No. 2	12.00-12.50
Los Angeles, No. 1	13.00-13.50
Los Angeles, No. 2	12.00-12.50
N. Y. dock No. 1 exp.	11.50-12.00
Pitts., No. 1 (R. R.)	15.75-16.25
Pittsburgh, No. 1	14.50-15.00
Pittsburgh, No. 2	13.25-13.75
St. Louis, R. R.	13.00-13.50
St. Louis, No. 2	12.00-12.50
San Francisco, No. 1	12.00
Seattle, No. 1	10.00-11.00
Toronto, dirs. No. 1	10.00-10.50
Valleys, No. 1	14.50-15.00

COMPRESSED SHEETS

Buffalo	12.00-12.50
Chicago, factory	11.75-12.25
Chicago, dealer	10.25-10.75
Cincinnati, del.	10.00-10.50
Cleveland	13.00-13.50
Detroit	11.25-11.75
E. Pa., new mat.	14.50-15.00
E. Pa., old mat.	10.50-11.00
Los Angeles	12.50-13.00
Pittsburgh	14.50-15.00
St. Louis	10.00-10.50
Valleys	14.00-14.50

BUNDLED SHEETS

Buffalo, No. 1	12.00-12.50
Buffalo, No. 2	11.00-11.50
Cleveland	10.00-10.50
Los Angeles	14.00
Pittsburgh	13.25-13.75
St. Louis	7.50- 8.00
Toronto, dealers	4.00

SHEET CLIPPINGS, LOOSE

Chicago	8.50- 9.00
Cincinnati, dealers	6.00- 6.50
Detroit	8.00- 8.50
†Los Angeles	3.75- 4.00
St. Louis	7.00- 7.50

BUSHELING

Buffalo, No. 1	12.00-12.50
Chicago, No. 1	11.50-12.00
Cincin., No. 1, deal.	6.50- 7.00
Cincinnati, No. 2	2.75- 3.25
Cleveland, No. 2	7.25- 7.75
Detroit, No. 1, new	10.00-10.50
Valleys, new, No. 1	13.50-14.00
Toronto, dealers	4.00

MACHINE TURNINGS (Long)

Birmingham	†4.50- 5.00
Buffalo	6.50- 7.00
Chicago	6.50- 7.00
Cincinnati, dealers	3.75- 4.25
Cleveland	7.00- 7.50
Detroit	5.50- 6.00
Eastern Pa.	8.50- 9.00
Los Angeles	4.00- 4.25
New York	†3.50- 4.00
Pittsburgh	9.25- 9.75
St. Louis	4.00- 4.50
Toronto, dealers	4.25- 4.75
Valleys	8.50- 9.00

SHOVELING TURNINGS

Buffalo	8.00- 8.50
Cleveland	7.50- 8.00
Chicago	7.00- 7.50
Detroit	6.50- 7.00
Pittsburgh	10.25-10.75

BORINGS AND TURNINGS

For Blast Furnace Use

Boston district	2.00
Buffalo	8.00- 8.50
Cincinnati, dealers	3.25- 3.75
Cleveland	7.50- 8.00
Eastern Pa.	6.50- 7.00
Detroit	5.50- 6.00
New York	†2.50- 3.00
Pittsburgh	8.25- 9.75
Toronto, dealers	3.50

AXLE TURNINGS

Boston district	†7.50
Buffalo	9.50-10.00
Chicago, elec. fur.	11.50-12.00
Eastern Pa.	10.50-11.00
St. Louis	9.00- 9.50
Toronto	5.00

CAST IRON BORINGS

Birmingham	†6.00- 6.50
Boston dist. chem.	†6.00- 6.25
Buffalo	8.00- 8.50
Chicago	5.50- 6.00
Cincinnati, dealers	3.25- 3.75
Cleveland	7.25- 7.75
Detroit	5.50- 6.00
E. Pa., chemical	10.00-11.00
New York	†3.50- 4.00
St. Louis	2.00- 3.00
Toronto, dealers	3.50

RAILROAD SPECIALTIES

Chicago	15.00-15.50

ANGLE BARS—STEEL

Chicago	14.50- 15.00
St. Louis	13.50-14.00

SPRINGS

Buffalo	16.00-16.50
Chicago, coil	15.75-16.25
Chicago, leaf	14.50-15.00
Eastern Pa.	16.50-17.00
Pittsburgh	16.50-17.00
St. Louis	14.50-15.00

STEEL RAILS, SHORT

Birmingham	†12.00-12.50
Buffalo	17.00-17.50
Chicago (3 ft.)	15.25-15.75
Chicago (2 ft.)	15.75-16.25
Cincinnati, dealers	16.00-16.50
Detroit	16.50-17.00
Los Angeles	15.00-17.50
Pitts., 3 ft. and less	16.50-17.00
St. Louis, 2 ft. & less	15.00-15.50

STEEL RAILS, SCRAP

Boston district	†13.50-14.00
Buffalo	16.00-16.50
Chicago	13.00-13.50
Cleveland	17.00-17.50
Pittsburgh	16.00-16.50
St. Louis	13.25-13.75
Seattle	16.00

FROGS, SWITCHES

Chicago	13.00-13.50
St. Louis, cut	13.25-13.75

ARCH BARS, TRANSOMS

St. Louis	14.50-15.00

PIPE AND FLUES

Cincinnati, dealers	6.00- 6.50
Chicago, net	8.00- 8.50

RAILROAD GRATE BARS

Buffalo	10.00-10.50
Chicago, net	7.00- 7.50
Cincinnati, dealers	6.75- 7.25
Eastern Pa.	13.50
New York	†8.50- 9.00
St. Louis	8.50- 9.00

RAILROAD WROUGHT

Birmingham	†11.00-11.50
Boston district	†9.50-10.00
Chicago, No. 1 net	8.50- 9.00
Eastern Pa., No. 1	15.00-15.50
St. Louis, No. 1	10.75-11.25
St. Louis, No. 2	12.25-12.75
Toronto, No. 1 dlr.	10.00

FORGE FLASHINGS

Boston district	†7.25- 7.50
Buffalo	12.00-12.50
Cleveland	11.50-12.00
Detroit	9.00- 9.50
Los Angeles	9.00
Pittsburgh	13.00-13.50

FORGE SCRAP

Boston district	†6.50
Chicago, heavy	15.00-15.50

LOW PHOSPHORUS

Buffalo, crops	16.50-17.00
Cleveland, crops	18.00-18.50
Eastern Pa., crops	16.50-17.00
Pittsburgh, crops	17.00-17.50

LOW PHOS. PUNCHINGS

Buffalo	15.50-16.00
Chicago	15.50-16.00
Eastern Pa.	17.00-17.50
Pittsburgh	16.50-17.00
Seattle	15.00

RAILS FOR ROLLING

5 feet and over

Birmingham	†14.00-15.00
Boston	15.00-15.50
Chicago	16.00-16.50
New York	†15.00-15.50
Eastern Pa.	17.00-17.50
St. Louis	16.50-17.00

STEEL CAR AXLES

Birmingham	†15.00-16.00
Buffalo	16.50-17.00
Boston district	†16.00
Chicago, net	18.50-19.00
Eastern Pa.	21.50-22.50
St. Louis	18.50-19.00

LOCOMOTIVE TIRES

Chicago (cut)	14.50-15.00
St. Louis, No. 1	13.50-14.00

SHAFTING

Boston district	†14.75-15.00
New York	†15.00-15.50
Eastern Pa.	19.50-20.00
St. Louis, 1¼-3¾"	17.00-17.50

CAR WHEELS

Birmingham	†13.50-14.00
Boston dist., iron	†11.00
Buffalo, steel	16.50-17.00
Chicago, iron	13.00-13.50
Chicago, rolled steel	14.50-15.00
Cincin., iron, deal.	13.25-13.75
Eastern Pa., iron	16.50-17.00
Eastern Pa., steel	16.50-17.00
Pittsburgh, iron	14.50-15.00
Pittsburgh, steel	16.50-17.00
St. Louis, iron	13.75-14.25
St. Louis, steel	14.75-15.00

NO. 1 CAST SCRAP

Birmingham	†12.50-13.00
Boston, No. 1 mach.	†11.00-11.50
N. Eng. del. No. 2	11.50-12.00
N. Eng. del. textile	12.50-13.00
Buffalo, cupola	14.50-15.00
Buffalo, mach.	15.50-16.00
Chicago, agri. net	10.75-11.25
Chicago, auto net	11.50-12.00
Chicago, railr'd net	11.00-11.50
Chicago, mach. net	11.75-12.25
Cincin., mach. deal.	11.75-12.25
Cleveland, mach. net	16.75-17.25
Eastern Pa., cupola	16.50-17.00
E. Pa., mixed yard	14.00-14.50
Los Angeles, net	13.50-14.00
Pittsburgh, cupola	15.00-15.50
San Francisco, del.	13.50-14.00
Seattle	10.00-12.00
St. Louis, cupola	12.00-12.50
St. L., No. 1, mach.	14.00-14.50
St. Louis, agr. mach.	12.75-13.25
Toronto, No. 1, mach., net	11.00-12.00

HEAVY CAST

Boston dist. break.	†10.75-11.00
New England, del.	12.50-13.00
Buffalo, break.	11.00-11.50
Cleveland, break. net	13.00-13.50
Detroit, auto net	11.50-12.00
Detroit, break	9.50-10.00
Eastern Pa.	16.00
Los Ang., auto, net	13.00-13.50
New York, break.	†11.00-11.50
Pittsburgh, break	13.00-13.50

STOVE PLATE

Birmingham	†7.50- 8.00
Boston district	†8.00- 8.25
Buffalo	13.00-13.50
Chicago, net	8.00- 8.50
Cincinnati, dealers	6.75- 7.25
Detroit, net	8.50- 9.00
Eastern Pa.	13.50
New York, fdy.	†10.00-10.50
St. Louis	8.00- 8.50
Toronto dealers, net	7.50- 8.00

MALLEABLE

Birmingham, R. R.	†10.50-11.00
New England, del.	14.50-15.00
Buffalo	13.50-14.00
Chicago, R. R.	13.50-14.00
Cincin., agri. deal.	11.25-11.75
Cleveland, rail	15.00-15.50
Eastern Pa., R. R.	15.50-16.00
Los Angeles	17.50-18.00
Pittsburgh, rail	14.25-14.75
St. Louis, R. R.	11.50-12.00

Iron Ore

Lake Superior Ore

Gross ton, 51½% Lower Lake Ports

Old range bessemer	$5.25
Mesabi nonbess.	4.95
High phosphorus	4.85
Mesabi bessemer	5.10
Old range nonbess.	5.10

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56.63% con.	9.00-9.25
Cop.-free low phos. 58-60%	nominal

Foreign Ore

Cents per unit, c.i.f. Atlantic

Foreign manganiferous ore, 45.55% iron, 6-10% man. nom.	12.00
No. Afr. low phos.	13.00
Swedish low phos.	13.00
Spanish No. Africa basic, 50 to 60% nom.	9.00
Tungsten. sh. ton. unit, duty pd. nom.	$21.00
N. F., fdy., 55%	7.00
Chrome ore, 48% gross ton, c.i.f.	$23.00-24.00
Molybdenum ores sulphide, per lb. molybdenum contained, f.o.b. mill	0.75

Manganese Ore

Prices not including duty, cents per unit cargo lots.

Caucasian, 50-52% nom.	30.00-32.00
So. African, 50-52% nom.	30.00-32.00
Indian, 50-52%	Nominal

Sheets

Sheet Prices, Page 66

Pittsburgh—Delivery before the end of the year of all the sheet tonnage booked at temporarily low prices will necessitate increased production on the part of some mills. While the extent of forward coverage by various consumers varied, producers have substantial tonnages on books. Some users ordered all of their requirements for the remainder of the quarter. Production lately has been climbing steadily, with output of common and full finished sheets moderately above 50 per cent. With the peak of the fall agricultural season past, galvanized sheet operations have slipped 1 point to 65 per cent. Industrial demand for galvanized has tended upward but is offset by less business from jobbers.

Cleveland—New business in sheets is at a low ebb, following the buying flurry during the recent period of low prices. Producers report backlogs of hot and cold-rolled sheets sufficient to keep mills fairly active the remainder of this quarter. While considerable of this tonnage is of a speculative nature, representing more than actual fourth quarter needs at current consumption, it is believed that anticipated gains in requirements the next two months will absorb most of this excess tonnage. Prices are firm at the higher levels, with the possible exception of galvanized sheets in isolated instances.

Chicago—Production of flat-rolled steel has increased as a result of heavier buying during the temporary period of lower prices recently. Automotive interests accounted for the largest single share of such business. With the restoration of old prices, new bookings have quieted and are expected to remain relatively light for the next 30 days. However, the automotive industry's re-entry into the market in December is looked for. In the meantime, needs of consumers who did little forward buying recently are expected to maintain a fair market.

Boston—New business in sheets has slumped with the firming of prices. While a fair amount of business was taken at the lower quotations, sellers doubt if delivery of this tonnage will result in top-heavy inventories at the year-end. Demand from users of certain finishes, notably roofing sheets, is dwindling although still moderately heavy. Consumers of tack plate still have large inventories and did little buying during market weakness.

New York—Jones & Laughlin Steel Corp. is expected to furnish about 1795 tons of license tag stock for 1940 automobile plate requirements of this state through Albany Iron & Steel Supply Co., Albany, N. Y. The Albany company quoted $67.15 a ton, with a 2 per cent cash discount, according to purchasing officials, who reported steel for 1939 plate cost $80.18 a ton. While sheet orders are restricted by previous active buying, releases are expanding. Stove makers are busiest among consumers, but makers of electrical household appliances are releasing large lots in the accumulation of stocks for the holiday trade.

Philadelphia — Little additional sheet buying, especially by automotive interests, is seen for the remainder of this year in view of heavy coverage at recent concessions. Releases are substantial, reflecting capacity operations in some departments. Prices of both hot and cold-rolled sheets are firm.

Buffalo—Principally because of the recent flurry of buying at reduced prices, flat-rolled steel business in October will set a new high mark in more than a year. Buying has subsided with elimination of concessions, but most consumers are covered for the quarter. Rolling schedules have been increased to fill the heavier orders.

Cincinnati—Sheet shipments continue to expand, principally to the automotive industry. Miscellaneous demand, active for several months, is well maintained except in galvanized which is quieting seasonally. A decline in new bookings lately is an aftermath of purchasing during the period of price weakness. Rolling schedules hold around 60 per cent.

Birmingham, Ala.—Sheets remain in particularly strong demand. Production is at capacity, as for the past four or five weeks.

Strip

Strip Prices, Page 67

Pittsburgh—Strip production is expanding, recently having reached 45 per cent, with cold mills slightly more active. The rise in output of strip has been more rapid than in sheets, due to the greater dependence of the former on automotive buyers.

Boston—Cold strip mills have increased operations materially, some to the highest point since early this year, largely as a result of heavy bookings during recent price weakness. At the same time, miscellaneous buying of low-carbon strip is well sustained, while business in high-carbon and alloys, which were not included in price concessions, has improved. Prices have been firm since the withdrawal of lower figures.

New York — Narrow cold strip buying is well sustained and in spots shows gains, despite substantial covering by some consumers during the recent period of price weakness. This break was too brief to enable some buyers to cover, or they delayed too long before concessions were withdrawn. High carbon and alloy strip were not included in the breaks and demand for these grades is heavier. Jobbers, as a rule, led in covering on low carbon grades. The slump in new buying is generally less than expected as some users are replenishing inventories, and there has also been a material pickup in buying and releases by the automobile industry.

Birmingham, Ala.—Strip production is light as demand, because the cotton season is virtually over, has slowed down considerably. Ties will be produced, however, as stock against next season's business.

Plates

Plate Prices, Page 66

Cleveland—Large tonnages are absent among new plate inquiries, but small orders have increased slightly since the firming of sheet prices. Railroad buying is limited to only necessary repairs, while demand for structural purposes shows little improvement.

Chicago — Except for requirements in bridge building plate producers report little business in larger tonnages, although demand still is fair. Fabricators continue to order for immediate needs, with tank and oil refinery construction and public works taking heaviest shipments. A sizable tonnage will be required for additional freight cars ordered by the Southern railway.

Boston — Business in large diameter pipe, standpipes and shipbuilding material is outstanding in plates. Pipe installations at Boston and Dorchester involve 1500 tons of plates. Structural shops are taking larger lots, but boiler and miscellaneous plate fabrication lag. Plate prices are subject to occasional shading of about $2 a ton, a situation prevailing in this district for some time.

New York — Plate specifications are spotty but heavier, aided by firmer sheet prices which have induced plate buyers to release orders accumulated during the period of price weakness. The outlook is brightened by the large amount of

pending shipwork, including 27 cargo boats for the maritime commission and three battleships. Bids on the latter will be opened Nov. 2, having been postponed from Oct. 19. Except for the Southern car order, railroad requirements still lag.

Philadelphia — Pennsylvania railroad is expected in the market shortly for several hundred tons of plates for 25 locomotive tenders it will build at Altoona, Pa. Shipbuilders are slow to issue releases against work under contract, but a substantial tonnage is pending. Some boiler shops are slightly more active, but tank fabricators show little gain. Oil refinery work is a bright spot in the market. Italy is in the market for about 23,000 tons of plates, shapes and bars for ship work.

Washington — Work will start in six to eight months on three new liners for the United States maritime commission for trans-Pacific service, with plans now under way. The ships will require about 35,000 tons of steel and will cost $8,000,000 to $11,000,000 each.

Birmingham, Ala. — Following nearly three weeks of exceptionally brisk demand, plate business has eased during the past 10 days. Birmingham mills describe the present output as fair but additional business is believed to be in sight before the end of the year.

San Francisco — Plate inquiries are confined to lots of less than 100 tons while large tonnages also are absent among awards. Pending business is headed by 840 tons for a vessel for use in Alaskan waters on which Pacific coast builders are low.

Seattle — While no large tonnages are up for figures, Tacoma is arranging finances for proposed Green River supply line replacement, which will be a major steel pipe job. Award for construction of a coast and geodetic survey vessel, Seattle and Portland yards being tied for low bid, has not been announced. This involves 900 tons of plates and shapes. Water system improvement projects at Cle Elum and Leavenworth, Wash. involving respectively 570 and 150 tons of steel water pipe, are awaiting PWA approval before calling bids. Shops report a fair run of small tank and boiler work.

Plate Contracts Placed

1110 tons, 11,000 linear feet, 36-inch steel water pipe, Morton street, Dorchester district, Boston, metropolitan district commission, water division, to Walsh Holyoke Steam Boiler Works, Holyoke, Mass.; M. DeMatteo Construction Co., Roslindale, Boston, general contractor, $187,617.50; bids Oct. 13, spec. No. d-203.

380 tons, two standpipes, U. S. procurement division, treasury department, Boston, Mass., to Tippett & Wood, Phillipsburg, N. J.

185 tons, 1,000,000-gallon standpipe, Webster, Mass., to Chicago Bridge & Iron Co., Chicago; bids Oct. 17.

175 tons, 1,023,000-gallon standpipe, Foxboro, Mass., to Pittsburgh-Des Moines Steel Co., Pittsburgh; bids Oct. 15.

Unstated tonnage, lighthouse tender, Goldenrod class, additional award to Dubuque Boat & Boiler Works, Dubuque, Iowa, 123,200.

Plate Contracts Pending

9385 tons, including 6202 tons black and galvanized plates and 3183 tons, plates, sheets and strip, bureau of supplies and accounts, navy department; delivery Mare Island navy yard, Calif.; bids Nov. 4, schedule 4760; bids open same date schedule 4762, on 151,200 pounds half-oval steel bars and strip and Nov. 15, schedule 4735, on 113 tons medium bar rivet steel; delivery Mare Island.

1200 tons, inverted pipe siphons, 102-inch diameter; one 3610 feet long at Sudbury river crossing and second 1125 feet, Happy Hollow crossing, Weston Aqueduct, Framingham and Wayland, Mass., with alternate bids on plates and precast steel cylinder concrete pipe Nov. 2 to metropolitan district water supply commission, Boston; Massachusetts state project No. d-202.

1000 tons, plates, sheets and strip, mostly plates, Norfolk, Va., navy yard, bids Nov. 4, bureau of supplies and accounts, navy department, Washington, schedule 4783; under 4784, same date, bids close on several hundred tons, steel angles and shapes.

100 tons, including machinery, one relay barge or booster plant, Panama Canal, bids Nov. 2, spec. 3389.

100 tons or more, welded steel standpipe, 66 feet diameter, 100 feet high, Washington suburban sanitary commission, Washington; bids Nov. 9.

Unstated tonnage, 1.30 miles, 36 and 42-inch steel pipe with alternates, Oakwood avenue supply line, Hartford, Conn.; bids Oct. 31, board of contract and supply metropolitan district commission, Hartford, contract 36, material to be placed by general contractor.

Bars

Bar Prices, Page 66

Pittsburgh — Automotive releases are instrumental in increasing bar activity here. Jobbers, as well as miscellaneous consumers, also are in the market for larger lots. Orders from farm implement makers remain slow, but tractor builders are more active. The pickup in demand from jobbers is encouraging in that better activity among smaller users is indicated. Mills are prepared to give prompt delivery.

Cleveland—Following the firming of flat-rolled steel prices, demand for commercial and alloy steel bars has shown decided improvement. Auto partsmakers have increased their specifications, while road equipment builders are busier. Prices are firm.

Boston — Bar demand has been stimulated slightly by removal of the danger of price weakness and by gains in consumption. Forging shops are better buyers but are not pressing for shipment, with few carlot releases appearing. Bids close Nov. 1 on 276 tons of hot-rolled, nickel steel bars for the Boston navy yard and Nov. 14 on 105 tons of bars for the Picatinny arsenal, Dover, N. J.

New York—Bar sellers are encouraged by recent improvement in demand, particularly for cold drawn and hot alloy material. Jobbers are specifying more freely; the government is a good buyer for arsenals; shipyard specifications are at the peak for the year to date, with substantial new tonnages in prospect; and automotive accessory makers are stepping up demands. Releases from airplane manufacturers, most of whom are running full, continue good. Operations of machine tool builders, however, are slow to improve.

Philadelphia — Bar sales continue relatively light but widely diversified. Railroads still are out of the market. Warehouses are placing some fill-in lots. Prices are firm.

Buffalo — Bar sales are fairly steady, aided principally by sustained demand from miscellaneous sources. Automotive buying has failed to improve despite recent gains in assemblies.

Pipe

Pipe Prices, Page 67

Pittsburgh—Pipe is more active, aided by better movement of standard pipe out of jobbers' stocks and increased demand for mechanical and pressure tubing. Automotive needs are stimulating mechanical tubing business, although miscellaneous demand also is heavier. Housing and industrial applications contribute to better activity in standard pipe. Line pipe is dull, while oil country goods are in steady demand. Prices are firm in the absence of recurrence of previous weakness in the jobber market.

Boston — Business in merchant steel pipe retains recent gains. Prices are firm, except in a few districts. Cast pipe demand is tending upward principally in small lots. The district foundry has booked more than 1000 tons in three contracts, with a like amount probably distributed among other producers in minor tonnages. Metal pipe requirements for culverts and drainage continue substantial. Portland, Me., has bids on several thousand tons of 48-inch pipe, which will go reinforced concrete, but some 30-inch required in a water

line extension to Sabago Lake, Me., may go cast iron.

New York—Cast pipe buying is confined principally to small miscellaneous lots placed by contractors. Inquiry also is light. Pending business includes water line extensions at the Green Haven, N. Y., prison and at Lincoln Park, N. J., and Lewiston, N. Y. Nearly 1500 tons is pending in southern Connecticut. About 200 tons of 12-inch for Rockville Center, N. Y., went steel pipe.

Between 1500 and 1700 tons of steel pipe will be required for heating and plumbing work on the Queensbridge housing project, on which bids for the superstructure have been asked. About 500 tons of heating pipe has been placed for the Red Hook housing project. Steel pipe demand elsewhere is spotty but heavier than a year ago. Oil company buying is light.

Birmingham, Ala. — Anticipated business in cast iron pipe apparently moves nearer realization this week with reports from local plants that numerous lettings are scheduled for November and December. While no particularly large individual tonnages are involved, plants view the aggregate available business as entirely worth while. Operations locally continue on four-day-a-week basis, and are steadier than they have been any time this year.

San Francisco—Principal cast pipe award lately was 641 tons of 8 to 16-inch for the east bay municipal utility district, Oakland, Calif. Monticello, Utah, plans a $20,000 water system, while Indio, Calif., is expected to ask bids soon on 455 tons of 4 to 12-inch pipe. Total awards for the year to date are 25,853 tons, against 24,239 tons a year ago.

Seattle — New projects for water system improvements are developing rapidly as federal funds become available. Jobs pending include 100 tons for Twenty-fourth avenue S W., Seattle. Selah, Wash., plans a $45,000 project, with WPA funds, involving 12,000 feet of 4, 6 and 8-inch pipe. Rogue River, Oreg., has called bids Nov. 7 for a $23,000 improvement and Jacksonville, Oreg., has a $46,000 project up for figures Nov. 11.

Cast Pipe Placed

865 tons, 30-inch, Newton, Mass., to Warren Pipe Co., Everett, Mass.
685 tons, 18,702 feet, various sizes, Panama, to United States Pipe & Foundry Co., Burlington, N. J.; bids Oct. 20, schedule 3390.
641 tons, 8 to 16-inch, class 150, east bay municipal utility district, Oakland, Calif., to United States Pipe & Foundry Co., Burlington, N. J.
400 tons, 4, 6 and 8-inch, Yakima, Wash., to H. G. Purcell, Seattle, for U. S. Pipe & Foundry Co., Burlington, N. J.
200 tons, 16-inch, Bath, Me., to United States Pipe & Foundry Co., Burlington, N. J.
140 tons, 12-inch, Foxboro, Mass., to Warren Pipe Co., Everett, Mass.
135 tons, 12-inch, Westfield, Mass., to Warren Pipe Co., Everett, Mass
103 tons, 4 and 6-inch, class 150, Burbank, Calif., to unnamed interest.

Cast Pipe Pending

455 tons, 4 to 12-inch, Indio, Calif.; bids soon.
300 tons, 16-inch, Sanford, Me.; bids in.
200 tons, 10-inch, North Stratfield, N. H.; bids in.
125 tons, 4, 6 and 10-inch, Ephrata, Wash.; bids Nov. 11.
100 tons, 2 to 6-inch, Angle Lake, Wash.; bids Nov. 9.

Wire

Wire Prices, Page 67

Pittsburgh — Wire demand is steady, an increase in manufacturers' wire business offsetting the seasonal decline in merchant products. Recent price concessions are disappearing, manufacturers' wire appearing steady in the face of heavier orders. The latter are contributed principally by automotive sources, although miscellaneous users also are more active in buying. Jobber demand is steady. Wire production is estimated about 65 per cent, high point of the year.

Cleveland — Reflecting increased activity among automotive suppliers, demand for wire rods, spring wire and other manufacturers' wire shows encouraging gains. Merchant items are less active, and little improvement is expected in the near future. Finishing operations have increased to the best level this year. Prices are firm.

Chicago—Wire and wire products demand again is tending upward, following a temporary lull earlier in October when steel prices were unsettled. Wire mesh requirements of roadbuilders are tapering seasonally, but this loss is offset by gains in needs of automotive and miscellaneous users. Farm consumption also is slightly stronger.

Boston — Mill and warehouse stocks of weatherproof and other wire used by power, lighting, telephone and other utilities are well depleted following heavy purchasing for storm damage repairs. While needed less urgently, buying of such stock continues brisk as some of the repair work being done is temporary and will require heavy additional requirements. There has also been a strong demand for nails, with prices steadier. Manufacturers' wire, specialties and practically all wire products are more active, with prices firmer following the withdrawal of concessions on flat-rolled steels. Production has been stepped up.

New York — Wire buying has improved materially, covering a wider range of products. In spots where weakness has been appearing from time to time, prices are firmer, including nails, although some shading is still evident in the latter. Consumption in various lines has stepped up, one evidence being a better demand for heavy rods by bolt and nut makers. Rod volume in general has improved considerably. Spring wire continues active with better volume coming in from the automotive trade. More is also being done in specialties.

Birmingham, Ala. — Somewhat contrary to expectations, output of wire products has remained consistently steady. Current demand is steady and production is estimated at not less than 70 per cent.

Rails, Cars

Track Material Prices, Page 67

With placing of 2400 freight cars by the Southern Railway, domestic freight car awards in October will be the best since May, when buying by the Southern Railway contributed mainly to the best monthly total so far this year, 6014 cars. Last month 1750 cars were placed, August 182 and July, none.

The Southern has also awarded 25 allsteel express cars to Bethlehem Steel Co., contingent on approval by interstate commerce commission.

New York Central has awarded 20 diesel oil-electric switching locomotives to Electro-Motive Corp., La-Grange, Ill., and nine to American Locomotive Co., New York. Kansas City Terminal has asked bids on three diesel electric switchers.

Electro-Motive Corp. is preparing to produce high-speed freight locomotives powered with diesel-electric motors, the first unit to be in service early next year.

Chicago, Burlington & Quincy is preparing an inquiry for steel rails which will be issued for bids before the end of the year, tonnage not yet determined.

Cars Placed

Board of transportation, New York, four motor flat cars and two money collection cars to St. Louis Car Co.; one crane car to Magor Car Corp., Passaic, N. J.; subject to approval by city board of estimates.
Southern Railway, 25 allsteel express cars, to Bethlehem Steel Co., subject to interstate commerce commission approval.
Southern Railway, 2400 cars, subject to interstate commerce commission approval, as follows: 1300 box cars to

Pullman-Standard Car Mfg. Co., Birmingham, Ala.; 1000 gondolas to Mount Vernon Car Mfg. Co., Mount Vernon, Ill.; 100 stock cars to Ralston Steel Car Co., Columbus, O.

Locomotives Placed

New York Central, 29 diesel oil-electric switchers for Buffalo district; 20 to Electro-Motive Corp., LaGrange, Ill., nine to American Locomotive Co., New York.

St. Louis & San Francisco, five 4-8-2 locomotives to own shops.

Locomotives Pending

Kansas City Terminal, three diesel switching locomotives, 700 horsepower; bids asked.

Buses Booked

American Car & Foundry Motors Co., New York: Eight motor coaches for Houston Electric Co., Houston, Tex.; two for Carolina Coach Co., Raleigh, N. C.; one for Cumberland & Western-port Transportation Co., Frostburg, Md.

J. G. Brill Co., Philadelphia: Three 40-passenger trolley coaches for Des Moines Railway Co., Des Moines, Iowa, making 31 bought this year.

Shapes

Structural Shape Prices, Page 66

New York—Led by 4500 tons, three hangars and pumping station, North Beach airport, New York, inquiry has again turned upward. New inquiries approximate 8000 tons, 500 of which is bid. Wilaka Construction Co. is low on the Bronx, N. Y., veterans' hospital, 3000 tons. Fabricated steel prices continue weak.

New business booked during September was slightly better than the average monthly business so far this year while shipments for the month were slightly less than the same average, according to reports received by the American Institute of Steel Construction. Bookings during the first nine months totaled 769,621 tons compared with 1,334,451 tons last year. Shipments showed a slightly better proportion during the same period, 831,345 tons against 1,266,095 tons last year. Totals for September were: Shipments, 90,900 tons; bookings, 89,828 tons.

Pittsburgh — Structural markets are more active after a letdown earlier this month. Inquiries are more numerous including a fair number of jobs taking more than 100 tons. Few privately-financed projects are included among awards or inquiries, however. A large tonnage for work financed by federal funds will be up for bids within several weeks.

Cleveland—While public projects dominate structural inquiries, with pending and proposed work approximating 10,000 tons, one of the largest of recent awards calls for about 6000 tons for a mill building for Youngstown Sheet & Tube Co., Indiana Harbor, Ind. Local bookings include 400 tons of shapes and 180 tons of piling for the East Ninth street bridge, Cleveland. Inquiries are expected soon for a Lakewood, O., apartment building, taking 2000 tons. Fabricated prices continue weak.

Chicago — Fabricated structural shape demand is heavier, with about 23,000 tons involved in pending projects. Many of these items take less than 100 tons. Indications point to further improvement in coming weeks. New inquiries for larger lots are confined almost entirely to bridges.

Boston—Contracts include 2500 tons for bridges, five accounting for 2000 tons, the others being small I-beam and stringer types. To expedite repairs, notably in Massachusetts, some general contracts are being placed without competitive bidding. Practically all of this tonnage is being fabricated at shops outside New England, although two district fabricators have slightly better backlogs. The bulk of building centers around public work with a federal jail, Danbury, Conn., closing Nov. 1. Bethlehem Steel Co. booked a 600-ton bridge, two 184-foot truss spans, Westfield, Mass.

Philadelphia — Hughes Foulkrod Co., Philadelphia, is low on the general contract for the Philadelphia navy yard structural assembly shop taking 4100 tons of shapes, and is also low on a turret shop requiring 2900 tons. Several new public jobs are before the trade including grade elimination work. Prices are still low, averaging less than 3 cents per pound, fabricated and delivered.

San Francisco — Awarding of 2449 tons for a foundry at the Mare Island, Calif., navy yard is outstanding in structural bookings. Other orders are headed by 526 tons for a hangar at San Clement, Calif. Total contracts of 4675 tons bring the aggregate for the year to date to 129,173 tons, against 133,512 tons a year ago. Interest in prospective work centers on opening of bids next month on 15,000 tons or more of transmission towers for the water and power department, Los Angeles.

Cincinnati—The state of Kentucky has tabled a bridge project at Rockport which required 1400 tons. Bids had already been sought.

Shape Awards Compared

	Tons
Week ended Oct. 29	**30,773**
Week ended Oct. 22	**14,369**
Week ended Oct. 15	**10,294**
This week, 1937	**8,061**
Weekly average, year, 1937	**23,251**
Weekly average, 1938	**19,497**
Weekly average, September	**36,500**
Total to date, 1937	**1,056,179**
Total to date, 1938	**857,874**

Includes awards of 100 tons or more.

Shape Contracts Placed

6000 tons, Youngstown Sheet & Tube Co., building, Indiana Harbor, Ind., to Fort Pitt Bridge Works, Pittsburgh.

5000 tons, bridge, Ohio river, Rockport, Ind., to Nashville Bridge Co., Nashville, Tenn.

2700 tons, apartment, Riverside drive, New York, to Harris Structural Steel Co., New York; Emery Roth, New York, architect.

2449 tons, foundry for navy yard, Mare Island, Calif., to Moore Drydock Co., Oakland, Calif.

2000 tons, repairs, Williamsburg bridge, New York, to Taylor-Fichter Steel Construction Co., New York.

2000 tons, White Hill industrial school, Harrisburg, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

725 tons, grade crossing eliminations, Pennsylvania railroad, Woodbridge, N. J.; James Stewart & Co., New York, general contractor.

600 tons, two 184-foot truss spans, Westfield, Mass., to Bethlehem Steel Co., Bethlehem, Pa.; Daniel O'Connell's Sons Co., Holyoke, Mass., general contractor.

600 tons, addition, Mackenzie high school, Detroit, to American Bridge Co., Pittsburgh.

526 tons, hangar, San Clement, Calif., to National Iron Works, San Diego, Calif.

500 tons, steel sheet piling, Port of Seattle bulkhead improvement, to Bethlehem Steel Co., Seattle; General Construction Co., Seattle, general contractor.

500 tons, small bridges, flood repairs, in Massachusetts, to American Bridge Co., Pittsburgh; through Lane Construction Co., Meriden, Conn.

450 tons, power station, for The Texas Co., Port Arthur, Tex., to American Bridge Co., Pittsburgh.

450 tons, addition, Denby high school, Detroit, to Fort Pitt Bridge Works, Pittsburgh.

425 tons, building, National Gypsum Co., Savannah, Ga., to Ingalls Iron Works, Birmingham, Ala.; through George A. Fuller Co., New York.

405 tons, Second avenue bridge, Alpena, Mich., to R. C. Mahon Co., Detroit.

405 tons, office building, Bloomington, Ill., to Mississippi Valley Structural Steel Co., Decatur, Ill.

400 tons, East 9th street bridge, Cleveland, to Carnegie-Illinois Steel Corp., Pittsburgh; through National Engineering Co., Cleveland, also include 180 tons of piling.

350 tons, Lakeview housing project, Buffalo, to Bethlehem Steel Co., Bethlehem, Pa.; John W. Cowper Co., Buffalo, general contractor.

325 tons, bridges, Hawley-Charlemont, Mass., to Bethlehem Steel Co., Bethlehem, Pa.; B. A. Gardetto, Inc., Boston general contractor.

300 tons, vocational addition to high school, Oil City, Pa., to Truscon Steel Co., Youngstown, O.

300 tons, high school, Coatesville, Pa., to Phoenix Bridge Co., Philadelphia.

280 tons, bridge, Bucks county, Pennsylvania, to American Bridge Co., Pittsburgh.

270 tons, building, Muhlenburg hospital, Plainfield, N. J., to Savary & Glaeser

Co., Dunnellen, N. J.; through A. L. Hartridge Co., New York.
260 tons, grade crossing, Brookhaven, N. Y., to American Bridge Co., Pittsburgh; through Zara Contracting Co., New York.
225 tons, nine oil derricks, Universal Consolidated Oil Co., Union Pacific Railroad Co. and Pacific Dock & Terminal Co., Long Beach, Calif., to unnamed interest.
223 tons, highway bridge, Minneapolis, to Bethlehem Steel Co., Chicago.
200 tons, municipal water works, Rock Island, Ill., to Rock Island Bridge & Iron Co., Rock Island, Ill.
190 tons, Suttler Slough bridge, Sacramento county, California, for state, to Minneapolis-Moline Power Implement Co., Minneapolis.
185 tons, carbonizing plant, Coal Carbonizing Co., East St. Louis, Ill., to Stupp Bros. Bridge & Iron Co., St. Louis.
175 tons, Neoprene plant, Carney's Point, N. J., to Belmont Iron Works, Philadelphia.
175 tons, subway 143-H-1, York, Nebr., for state, to St. Joseph Structural Steel Co., St. Joseph, Mo.
165 tons, chemical engineering building, Purdue University, Lafayette, Ind., to Indiana Bridge Co., Inc., Muncie, Ind.
160 tons, Brazilian building, World's fair, New York to Ingalls Iron Works, Birmingham, Ala.; through Hegeman Harris Co., New York.
135 tons, garage, General Baking Co., Charlestown district, Boston, to Lackawanna Steel Construction Co., Buffalo.
135 tons, East Side high school, Indianapolis, Ind., to Insley Mfg. Co., Indianapolis.
135 tons, public school 159, Queens, N. Y., to Bethlehem Fabricators, Inc., Bethlehem, Pa.
130 tons, state bridge, Williamstown, Mass., to American Bridge Co., Pittsburgh.
120 tons, bridge over Delaware, Lackawanna & Western railroad, connecting link, routes 28 and 24, Hopatcong, N. J., to Easton Steel Structures, Inc., Easton, Pa.; M. A. Carty Construction Co., Phillipsburg, N. J., general contractor, bids Oct. 19, Trenton.
100 tons, trash racks, quotation 8467, Los Angeles, to Pacific Iron & Steel Co., Los Angeles.
100 tons, Missouri building, World's fair, New York, to Grand Iron Works, New York; through Fred T. Ley & Co., New York.

Shape Contracts Pending

7000 tons, 4100 for assembly shop and 2900 for turret shop, for Philadelphia navy yard; Hughes Foulkrod Co., Philadelphia, low.
4500 tons, three hangars and pumping station, North Beach airport, New York; bids Oct. 31 to procurement division, treasury department, New York.
3000 tons, veterans' hospital, Bronx, N. Y.; Wilaka Construction Co., New York, low; bids Oct. 27, Washington.
2200 tons, building No. 4, navy yard, Brooklyn; Hudson Contracting Co., Inc., New York, low.
1500 tons, estimated, foundry, navy yard, Mare Island, Calif., Moore Dry Dock Co., Oakland, Calif., low $229,675; bids steel direct to bureau of yards and docks, navy department, Washington, Oct. 19, spec. 8816.
1500 tons, ventilation building, Queens side, Queens-Manhattan midtown tunnel; bids Nov. 15.
1500 tons, estimated, federal jail, Danbury, Conn.; bids Nov. 1.
1140 tons, grade elimination, 22nd and Allegheny avenue, Philadelphia, McClosky & Co., Philadelphia, low.
1000 tons, embedded anchorage, Grand Coulee dam, closing Nov. 7.
950 tons ,public school 194, Manhattan, N. Y.; bids on steel direct, fabricating and erecting, Nov. 7, board of education.
835 tons, bridges, Roswell, N. M.; bids in.
800 tons, grade elimination, Abson, N. J., for Pennsylvania railroad; bids Nov. 15, also includes 200 tons of bars.
700 tons, hoist house head frame, etc., for Homestake Mining Co., Lead, S. Dak.
700 tons, four highway bridges, for state of Illinois.
700 tons, third crossing, Sacramento river, Central Valley project, Calif.; bids Nov. 17.
600 tons, superstructure, Queensbridge housing project, New York; Cauldwell-Wingate Co., New York, low
572 tons, bridge, Murrill, Wis.; bids in.
530 tons, state bridge RC-4000, Herkimer county, New York; Green Island Construction Co., Inc., Green Island, N. Y., contract, $126,632.90, bids Oct. 25, Albany.
500 tons, buildings, Richardson & Boynton Co., Queens, N. Y.
500 tons, biological science building, University of Kentucky, Lexington, Ky.
500 tons, steel buttresses, Grand River Junction, Okla.
450 tons, bridgework, Buttermilk hollow road, Pittsburgh, for Allegheny county, Pennsylvania.
423 tons, bridge, Landon, Mass.; bids in.
400 tons, municipal garage and brake

Adaptable

● Shafer self-aligning roller bearings and units are readily adaptable to the great majority of industrial bearing needs. Their CONCAVE roller design provides generous radial-thrust capacity, integral self-alignment, simple adjustability—and performance that combines "everything you need in a roller bearing."

SHAFER BEARING CORPORATION, 35 EAST WACKER DRIVE, CHICAGO

Available in a full range of sizes: Pillow Blocks • Flange Units • Take-up Units • Hanger Boxes • Cartridge Units Duplex Units • Conveyor Rolls • Radial-thrust Roller Bearings

test building, Cincinnati.
337 tons, bridge, route 6, section 8B, Clifton, N. J.; Franklin Construction Co., Newark, low.
335 tons, movable bridge, Southport-Boothbay Harbor, Me.; bids Nov. 9, PWA project No. Main 1120F; contract 2, steel superstructure estimated $73,000; contract 1, substructure and approaches estimated $97,000; Max L. Wilder, bridge engineer, state highway commission, Augusta.
325 tons, city hall and police station, Nashua, N. H.
325 tons, New York approach, southerly portion connection to Harlem river speedway through Highbridge park, contract HRB-35, George Washington bridge; bids Nov. 1, Port of New York authority.
310 tons, bridges, Colrain, Heath, Rowe and Monroe, Mass.; Lane Construction Co., Meriden, Conn., general contractor.
300 tons, school addition, Ridgefield, Conn., for board of education.
300 tons, city hall and police station, Nashua, N. H.
300 tons, grade separation bridge, Lincoln, Ill., for state.
300 tons, building, Hercules Powder Co., Wilmington, Del.
300 tons, school, Eden, N. Y.
295 tons, garage and office building, Green Bus Co., Jamaica, N. Y.
285 tons, rebuilding bridges, transit commission, Bronx, N. Y.; Cayuga Construction Corp., New York, low, bids Oct. 20.
250 tons, bridgework, Curry Hollow road, Pittsburgh, for Allegheny county, Pennsylvania.
250 tons, state bridge, Harrison, Ill.
250 tons, grade crossings, Erie railroad, Allendale, N. J.; George M. Brewster & Son Co. Bogota, N. J., low, bids Oct. 20.
250 tons, school, Pulaski, N. Y.
250 tons, grade crossing elimination, West Shore railroad, Bogota, N. J.; Ollie Hansen, Venta, N. J., low, bids Oct. 20.
235 tons, bridge, Tonnelle avenue, Jersey City, N. J.; J. B. Burns, Dumont, N. J., low.
225 tons, repairs to Bloomfield bridge, Pittsburgh, for city.
225 tons, tunnel supports, specification 808, Provo river project, Utah; bids opened.
225 tons, half-through, plate girder spans, Lodi, Wis.
220 tons, federal jail, Ashland, Ky.
215 tons, Bensmiller overhead, Columbia county, Wisconsin; bids in.
210 tons, bridges, Lyden-Buckland, Mass.; Kelleher Corp., Turners Falls, Mass., general contractor.
200 tons, fourth crossing of Sacramento river, Central Valley project, Calif.; bids Nov. 17.
171 tons, 18 stop log sections, Bonneville dam; Worden-Allen Co., Milwaukee, low.
165 tons, alterations to incinerator plants, Cincinnati.
157 tons, including miscellaneous metal work, fish control station, Leavenworth, Wash.; Nat McDougall, Portland, low.
150 tons, building changes, Elmira Free Academy, Elmira, N. Y.
150 tons, school, Chappaqua, N. Y.
135 tons, Buckland bridges, Shelbourne Falls, Mass., for state.
130 tons, Red Rock bridge, Bloomsburg, Pa., for Columbia county.
125 tons, process building, chlorinated rubber plant, for Hercules Powder Co., Parlin, N. J.
125 tons, high school, Windsor, Vt.
120 tons, connecting link bridge, Warren county, New Jersey; M. A. Carty Construction Co., Phillipsburg, N. J., low.
116 tons, Shipley bridge, Clackamas county, Oregon for state; bids Nov. 9.
115 tons, storage building, for Stover Mfg. & Engine Co., Freeport, Ill.

Reinforcing

Reinforcing Bar Prices, Page 67

New York—Price weakness continues to depress reinforcing steel volume with new inquiry coming out slightly heavier. Sales approaching $10 a ton under the listed market have been noted with $5 shading frequent. New inquiry bid involves close to 7500 tons, Cauldell-Wingate Co., New York, being low on the largest pending project, Queensbridge housing, 5000 tons. Of close to 2000 tons of highway mesh pending for New York state under three openings, approximately 500 tons has been bought.

Pittsburgh—Reinforcing bar prices are holding fairly well in some sections, although weakness is prevalent in Baltimore, Washington and New York markets. New projects are numerous, with prospects good. Fairly large tonnages are expected, although figures have not yet been announced on a group of dormitories at Ann Arbor, Mich., for the University of Michigan. The first section of the Pennsylvania turnpike takes only 200 tons of concrete bars from a total estimated to run about 22,000 tons. This project will also take a considerable tonnage of wire mesh.

Cleveland—Reinforcing bar demand for private work remains slow, but pending public projects are more encouraging despite a temporary lull in awards. A number of bridges are due for bids in November and will take substantial bar tonnages. Fabricated prices continue weak on recent small orders.

Chicago—Although supported at a fair rate by a large number of small orders and inquiries, market activity is aided by the appearance of several larger jobs. Outstanding in private consruction are five apartment and housing projects now under way or contemplated, to cost $10,000,000. Bar purchases for the new subway are not looked for before the end of the year.

Boston—Reinforcing steel buying is brisk, although mostly involving relatively small tonnages. Inquiry is also increasing, notably for small bridges with larger requirements out for a bridge substructure at Southport-Boothbay, Me., closing Nov. 9. Reinforcing steel prices, still weak, have failed to reflect firmness in other steel products.

Philadelphia—Several sewage jobs and other public work is lending a slightly more active appearance to the concrete bar market. McClosky & Co., Philadelphia, is low on the Security prison, Mt. Gretna, Pa. Most of current awards are in lots less than 100 tons. Prices are weak.

San Francisco—Reinforcing bar awards for the week were about 3100 tons, bringing the total to date to 119,743 tons, compared with 83,567 tons a year ago. Outstanding among bookings was 1300 tons for various buildings at the naval base, San Diego, Calif. Other awards include 200 tons for a city hall, Upland, Calif. Additional tonnages for work at the naval base and at Fort Mason here are pending.

Concrete Bars Compared

	Tons
Week ended Oct. 29	**6,555**
Week ended Oct. 22	**7,522**
Week ended Oct. 15	**9,070***
This week, 1937	**4,394**
Weekly average, year, 1937	**6,061**
Weekly average, 1938	**6,300**
Weekly average, September	**10,950**
Total to date, 1937	**273,593**
Total to date, 1938	**287,243**

Includes awards of 100 tons or more.

Reinforcing Steel Awards

2200 tons, Puget Sound navy yard graving dock, to Bethlehem Steel Co., Seattle; General Construction Co., Seattle, general contractor.
600 tons, state highway bridge, Oklahoma City, Okla., to Sheffield Steel Corp., Kansas City, Mo.; Forcum James Co., contractor.
500 tons, grade crossing, Woodbridge, N. J., to Bethlehem Steel Co., Bethlehem, Pa.; through James Stewart & Co., New York.
450 tons, filtration plant, Gloversville, N. Y., to Jones & Laughlin Steel Corp., Pittsburgh; Lange-Finn Construction Co. Inc., Albany, N. Y., general contractor.
350 tons, plant, Buick Motor division, General Motors Corp., Flint, Mich., to Truscon Steel Co., Youngstown, O.; J. A. Utley Co., Detroit, contractor.
340 tons, building, Froedert Milling Co., Winona, Minn., to Inland Steel Co., Chicago, through Metcalf Engineering Co.
250 tons, high school, Malden, Mass., part to Concrete Steel Co., New York; Rugo Construction Co., Boston, general contractor.
220 tons, Putnam street school, Hartford, Conn., to Sherer Steel Co., Hartford.
200 tons, city hall, Upland, Calif., to Soule Steel Co., Los Angeles.
200 tons, Lowell and Lincoln schools, Brainerd, Minn., to Bethlehem Steel Co., Bethlehem, Pa.; J. P. Hagstrom, contractor.
190 tons, Sheffield farms building, New York, to Concrete Steel Co., New York; through White Construction Co., New York.
190 tons, chemistry building, University

of Cincinnati, to West Virginia Rail Co., Huntington, W. Va.

150 tons, foundations, high school, Gloucester, Mass., to Truscon Steel Co., Youngstown, O.; Daniel Cunningham Construction Co. Inc., Boston, general contractor.

150 tons, culvert, Dogtooth Bend, Mo., to Bethlehem Steel Co., Bethlehem, Pa.; Stiers Bros. Construction Co., St. Louis, contractor.

135 tons, school, Warwick, R. I., to Truscon Steel Co., Youngstown, O.; Gilbane Building Co. Inc., Providence, R. I., general contractor.

130 tons, building, State Farm Mutual Insurance Co., Bloomington, Ill., to Laclede Steel Co., St. Louis; John Felmley Co., contractor.

100 tons, hospital, East Lansing, Mich., to West Virginia Rail Co., Huntington, W. Va.; J. A. Utley Co., Detroit, contractor.

100 tons, stadium, Newburyport, Mass., to Truscon Steel Co., Youngstown, O.

100 tons, Specification 3809, Los Angeles, to Gilmore Steel & Supply Co., San Francisco.

Reinforcing Steel Pending

5000 tons, superstructure, Queensbridge housing project, New York; Cauldwell-Wingate Co., New York, low.

1100 tons, Security prison, Mt. Gretna, Pa.; McClosky & Co., Philadelphia, low, includes 450 tons of shapes.

750 tons, Lakeview housing project, Buffalo, to Bethlehem Steel Co., Bethlehem, Pa.; John W. Cowper Co., Buffalo, general contractor.

600 tons, addition to storehouse, specification 8911, naval base, San Diego, Calif.; general contract to Wm. P. Neil Co., Los Angeles at $410,000.

500 tons, New York approach, southerly portion connection to Harlem river speedway through Highbridge park, George Washington bridge, New York; bids Nov. 1, port of New York authority.

450 tons, housing project, Syracuse, N. Y.; bids Nov. 4.

350 tons, sewage disposal, Chester, Pa.; bids Nov. 10.

300 tons, sewer, Metropolitan district commission, Boston, at Medford, Mass.; Edward M. Matz Inc. Boston, low.

270 tons, fish control station, Leavenworth, Wash., Coulee dam project; Nat McDougall, Portland, Oreg., low.

240 tons, Oakland office building, Illinois Bell Telephone Co., Chicago.

230 tons, barracks, Rantoul, Ill.

225 tons, building, Norge Co., Kalamazoo, Mich.

200 tons, city hall Bellingham, Wash.; bids in.

200 tons, outfall sewer, Decatur, Ill.

175 tons, three 125-man barracks, Fort Belvoir, Va.; William R. Goss Co., Chicago, low.

150 tons, municipal building, Danbury, Vt.

140 tons, mesh, highway project RC-4002, Stillwater-Schulerville, Saratoga county, New York, Thomas A. Brogan, Yonkers N. Y., contractor, $319,660.50; bids Oct. 25, Albany, N. Y.

117 tons, grade crossing, Erie railroad, Allendale, N. J.; George M. Brewster & Son, Bogota, N. J., low.

100 tons, armory building, Chicago.

100 tons, ventilation building, Queens side, Queens-Manhattan midtown tunnel; bids Nov. 15.

100 tons, training school, North Adams, Mass.; taking bids.

Unstated, penitentiary building, Terre Haute, Ind.

Unstated, penitentiary building, Ashland, Ky.

Pig Iron

Pig Iron Prices, Page 68

Pittsburgh — Movement of foundry pig iron has declined despite an increase in the melt so far this month, as indicated by the pickup in foundry coke demand. Pig iron consumption by both steelworks and foundries has been retarded by lower scrap prices which have increased the amount of old material going into open hearths and cupolas. Blast furnace activity is unchanged. A further increase is contemplated, but no additional stacks are expected to be blown in immediately. Pig iron prices are nominal, as little if any, business has been done at $21.

Cleveland—Pig iron releases continue to increase, with October shipments placed at 15 to 20 per cent ahead of September. Most active buyers recently have been automotive and heating equipment found-

Here's Your Answer
GAZE upon him—a Smith expert welding a particularly heavy and complicated job! Ability born of experience in being one of the staff that pioneered in this type of welding.
Put one of these men on a job of your own. Profit by the sum-total of Smith's experience and facilities. Write for Bulletin No. 134. Modernize with Smith Welding!
S. MORGAN SMITH
York COMPANY Pa.
ELDING by SMITH

Behind the Scenes with STEEL

Two-Way Stretch

■ Pull—eeze don't tell us you missed the "adv. of the year" which graces (and we do mean graces) page 5 of this historic issue. We were afraid for a while that Uncle Jim Farley would snatch our second class mailing permit right out from under our nose but we made a deal with him which consisted of 3 votes on Nov. 8 and a precancelled stamp from Bali Bali to add to his collection. What we like about Miss Goodrich best of all is her coy smile. It's the first thing we noticed. (Oh Yeah!) The boys here in the composition department haven't been able to get a nickel's worth of work done all week what with trying to pull off the most perfect proof possible, and never in the history of the press room has any one page been given so much attention. If Miss G. doesn't show up in all her glory it isn't because the boys didn't try.

Bare Facts

■ And out in Chicago, STEEL's editor Jim Powell tells of the foundrymen's picnic which ballyhoed a "bare" act to end all bare acts. The assembled foundrymen had visions of another Sally Rand but it turned out to be a giant grizzly bear who wrestled 3 willing stooges.

Toy Train

■ At the Three Rivers, Mich. plant of Fairbanks, Morse & Co. visitors enter the main gate and the watchman phones for an appointment. Then they are escorted to the plant by means of a railroad motor car on a switch truck, similar to those that section gangs ride on. It is all very impressive and ties in nicely as advertising for the company's maintenance of way equipment and motor cars.

On the Hook

■ We've learned our lesson about Phil Sowersby of General Electric's Nela Park, much to our regret. Phil is one of those harmless looking guys with a nice dry sense of humor which is at its best on or near a golf course. We've found out since it was just a come-on but last week, with a high wind blowing, we figured we'd better play our best game of "customer golf" which is just two shades worse than our usual dubbing. Well, we did—much to the amusement of Mr. Sowersby who pinned our ears back with a neat 77, which would take us at our fiery best.

Snappy

■ We received a good many resounding pats on the back for the October 10 Metal Show issue of STEEL but of all of them we liked what R. B. Webb of Keystone Steel & Wire Co. had to say. Mr. Webb was brief, complete and to the point. His one word commendation was: *Excellent.*

Wrong Wright

■ For some years it has been the custom of the Wright Mfg. Division of the American Chain & Cable Co. to greet each other with a "Wright"! Recently a story appeared in a New York paper that members of the Yankees habitually greet each other with a "Right"! Thereupon Charlie Veit, genial sales mgr. of Wright wrote J. O. Lasher, adv. mgr., that he had long realized that the latter's sphere of influence had permeated the fields of prize fighting, tennis and acrobatics but how he had ever been able to reach Colonel Ruppert to put this across would be a perpetual source of mystery to him.

Have You Heard It?

■ And to finish this off we can't resist telling that new WPA story we just heard. You see it seems that this fellow showed up on the project one morning after he had taken a . . . . but it doesn't look like we have room to finish it. A postcard will bring you the rest.

—SHRDLU

ries, while demand from railroads and farm implement builders generally is unchanged. Little contract buying has appeared lately, due to prior coverage over the remainder of the quarter.

Chicago — Pig iron shipments have increased further, deliveries so far this month being 25 per cent heavier than in September. In view of prior coverage by consumers, new business is spotty and is not expected to rise materially the remainder of this quarter, barring unexpected gains in foundry operations. Automotive needs supply a large share of recent and current expansion in the melt, with a less favorable showing made by farm equipment and railroad demand.

Boston—Pig iron sales drag, but October shipments reached a new peak for the year to date and prospects are brighter. Stove foundries retain recent operating gains, while better demand for castings from machine tool shops is indicated for the near future. Textile machinery foundries are slightly busier.

New York—The domestic market is dull in new buying, but several export inquiries are pending, including one of 5000 tons for European shipment. About 15,000 tons now is being figured for export, practically all for Europe.

Philadelphia — Shipments continue to gain slightly. New business is dull, but a few odd cars are being placed by foundries who did not cover prior to the recent price advance. Twenty-eight district gray iron foundries produced 4371 tons of castings in September, up 6.7 per cent from August but off 31.3 per cent from a year ago. Shipments of 4152 represented a gain of 16.4 per cent over August but a drop of 40.5 per cent from September, 1937.

Buffalo—October pig iron shipments show little change from September, but buying shows some signs of expansion. Malleable foundries are working on a few small orders for railroads. Such business, while light, is slightly better.

Cincinnati—Expansion in the melt has stimulated pig iron shipment, raising October deliveries about 20 per cent over September. Production of automotive parts and heating equipment chiefly is responsible for the increase.

St. Louis—Shipments and consumption continue to improve, making October the best month of the year in pig iron deliveries. A number of foundries now are on five-day schedules, aided by automotive releases and a fair volume of miscellaneous business. Stove and farm implement plants hold at recent operating rates.

Toronto, Ont.—While pig iron

sales hold around 2000 tons weekly, sellers look for increased buying in the near future. The melt has moved up to 60 per cent, with further improvement in sight as automotive operations increase. Pig iron production has tended upward since mid-summer, four furnaces now being in blast.

Scrap

Scrap Prices, Page 70

Pittsburgh — Scrap demand is extremely light, with unchanged prices prevailing on what small lots of open-hearth grades are being picked up by consumers. Mills responsible for recent gains in district production are not factors in the scrap market at present. Down-river interests still are buying light tonnages and are the chief support to current activity.

Cleveland—Following purchase of a moderate tonnage of heavy melting steel and compressed sheets by a large steelmaker prices have advanced. Some of the No. 2 scrap is said to have gone at $13.75. Shipments to outside mills continue, most being heavy steel.

Chicago—A strong undertone prevails in scrap here despite continued quiet. Prices are unchanged, but dealers are hesitant to sell at recent levels, while brokers are believed reluctant to accept any large orders for No. 1 steel at the present $13.50 market.

Boston—Some scrap prices are stronger. Breakable cast is up slightly, but No. 1 for New England delivery is off. Buying is light, but improved foundry operations indicate increased needs shortly. Boat-loading for export has been below normal for some time, but heavy melting steel for dock delivery is firm at $13.25 for No. 1. Barge movement down the coast is rather light, with No. 2 cast quoted $10.25, dock, or slightly higher.

New York — Scrap shipments to steelworks consumers are small but fairly steady, with buying limited to a few carloads at a time. Eastern mills, with one or two exceptions, are taking scrap freely against orders. Foundries are buying sparingly and close to requirements, although stocks are not large. Prices are steady. Export shipments are steady with prices for barge delivery unchanged, brokers paying $11.50 for No. 1 heavy melting steel and $10.00 to $10.50 for stove plate.

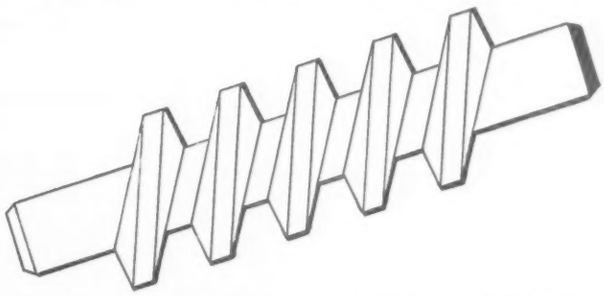
Philadelphia — Scrap is quiet in the domestic market, steelmaking grades finding best support in export trading where buying continues on the basis of $14 for No. 1, $13 for No. 2, Port Richmond. Some material also is scheduled to move from Wilmington. Recent reports that the European cartel is negotiating for 400,000 tons at $16 for No. 1 and $14.50 for No. 2 are denied here. It is pointed out the cartel could buy for at least $1 less if it were in the market. Pennsylvania railroad closes bids Nov. 2 on a list including about 18,000 tons of scrap.

Buffalo—The market has been enlivened by the purchase of about 8000 tons of No. 2 heavy melting steel by a local mill. Prevailing prices revealed no change from the recent $12 to $12.50 market. With the customary differentials, the sale placed No. 1 heavy melting steel at $14 to $14.50, the range in effect since last month.

Detroit—Scrap buying lately has been light, but bearish sentiment is tempered by the better feeling occasioned by rising automotive operations. Prices generally are unchanged, although the industrial grade of heavy melting steel specified by the local steel producer is off 25 cents. Dealers are disinclined

Inland Created Ledloy to Save Machining Costs

— It Saved $47.85 Per Ton on This Part



This case carburized worm shaft for a threshing machine was formerly made of X-1314 steel. Now it's cold finished Inland Ledloy, with reduced machining costs of $47.85 per ton of steel used.

If your product requires extensive machining operations, why not change to Inland Ledloy? Ledloy has all the desirable physical properties of standard open hearth steel plus remarkable machinability. Write for complete information and case studies showing savings reported by other manufacturers.

INLAND STEEL CO.

38 South Dearborn Street, Chicago

Sheets Strip Tin Plate Bars Plates Floor Plates Structurals Piling Rails Reinforcing Bars Track Accessories

to forecast price weakness, despite the heavier scrap supply coming from auto plants.

St. Louis—Scrap quotations are higher, although buying is slack and no new commitments are in immediate prospect. Scrap outlets still are confined to steelmaking furnaces, with other users out of the market. Railroad offerings are heavier, including new lists from five roads.

Toronto, Ont.—Scrap trading is in fair volume but demand is specialized. Shipments of heavy melting steel are steady, with yards carrying relatively small tonnages of No. 1 material. Mills have picked up large tonnages of steel scrap from railroads, but offerings from this source now are smaller. Prices are firm.

Warehouse

Warehouse Prices, Page 69

Pittsburgh—Business is rising, with miscellaneous consumers increasing their orders and inquiries more numerous. October will be substantially ahead of September, and the November outlook is fairly good.

Chicago—Sustained demand assures October will be the best month for the year to date. Almost equal activity is noted in all products, with prices firm. The November outlook is promising.

Boston—Partially the result of buying to repair last month's storm damage, October business in numerous items is well ahead of September. This is particularly true of roofing material, nails and mill supply goods.

New York—October warehouse business is 5 to 10 per cent ahead of September, with orders well diversified but generally small. Demand for heavy products is inclined to lag. Warehouse prices on sheets and strip were not affected by recent weakness in mill quotations.

Philadelphia — October is proving to be one of the two best months of the year for several jobbers, second only to January. Prices are none too steady.

Buffalo—Improvement in sales is spotty and less rapid than the pick-up in mill operations. October business is expected to do no better than equal that of September. Prices are steadier.

Cincinnati—Volume shows little change since a month ago, following moderation of a bulge earlier in the month. Bar and sheet demand continues fairly active, but orders for building items are disappointing.

St. Louis—Sales are largely for immediate needs, but the volume is satisfactory and well diversified. Coal mine operators have taken larger lots, and building materials are moving more actively. Demand for oil country goods remains brisk, though less active than earlier in the fall.

Seattle — Business is improved this week but continues spotty. Small lots prevail, with sheets leading. Prices are unchanged, in line with settlement of mill lists on sheets. In Washington price lists are being generally observed but reports from Portland indicate the situation there is still seriously unsettled by cutting on a number of items.

Steel in Europe

Foreign Steel Prices, Page 69

London—(*By Cable*)—Sentiment in the British iron and steel market is more cheerful as underlying conditions have improved, owing to absorption of accumulated stocks and import restrictions. New buying is limited, owing to expectation of price reductions for next year's delivery. Some immediate requirements are bringing better business to home producers. Some departments, especially shipbuilding, are still below normal but others are improving. Armament acceleration is an important factor.

The Continent is experiencing satisfactory export trade, especially to Scandinavia, Egypt and the Argentine.

Bolts, Nuts, Rivets

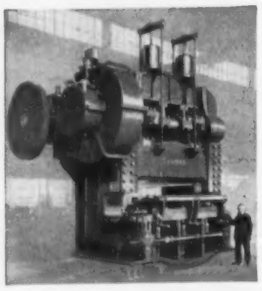
Bolt, Nut, Rivet Prices, Page 67

Bolt, nut and rivet specifications are heavier. Automotive activity partly is responsible for the betterment, although inquiries from other users are more numerous. Railroad needs, despite some improvement, remain small, but the outlook for orders from shipbuilders is more favorable. Stocks of jobbers and consumers are moderate and not large enough to act as a deterrent on additional specifications. Bolt and nut prices retain the weakness prevailing before the recent unsettlement in flat-rolled steel.

Cold-Finished Steel

Cold Finished Prices, Page 67

Pittsburgh — Cold-drawn bar markets report fair business, support coming mostly from automotive sources. Miscellaneous manu-

PUNCHES • SHEARS • SPACING TABLES
PRESSES • DIES • METAL-FORMING MACHINERY
BENDING AND STRAIGHTENING MACHINES • MULTIPLE DRILLS
When you think of SHEARS think of THOMAS

Thomas Shears are designed to meet the most exacting shearing requirements. They embody the most advanced improvements . . . features that lower upkeep to a minimum and give the greatest possible production and economy! Feeding tables and gauges can be designed and adapted to your specifications.
Let us quote on your requirements
THOMAS
MACHINE MANUFACTURING COMPANY
Name changed from Thomas Spacing Machine Co.
PITTSBURGH, PA.
FABRICATING MACHINERY

facturing is moving up, however, and more outlets are becoming active.

No "Breakdown" in Steelworks Construction

(*Concluded from Page* 15)

Corp.'s new Irvin works at Clairton, Pa., now in partial operation and scheduled to be completed within a few weeks.

In the Birmingham district, Tennessee Coal, Iron & Railroad Co.'s tin plate mill, a $30,000,000 project, is being rounded out, even to completion of modern bathhouse facilities and locker rooms. At Cleveland, a $4,000,000 rehabilitation program at the American Steel & Wire Co.'s Cuyahoga works is continuing.

Republic Steel Corp. after having completed a 98-inch sheet and strip mill at Cleveland, has gone ahead to rebuild two blast furnaces at Cleveland and Youngstown, O.; is rounding out a $3,000,000 improvement at Gadsden, Ala., including two new 150-ton open-hearth furnaces and a sheet mill; has started a new battery of 69 coke ovens at Youngstown, and other miscellaneous work.

Otis Steel Corp., Cleveland, has completed a well-rounded expansion and modernization program bringing its physical properties into good condition.

Weirton Will Spend $5,000,000

Weirton Steel Co. this summer announced a $5,000,000 expenditure to enlarge the Weirton plant to manufacture new lines of the heavier products, such as wide flange beams, heavy plate and rails. Some contracts already have been placed, others are being negotiated.

At Pittsburgh, Jones & Laughlin Steel Corp. contemplates no further expansion immediately. The company has started production in its wire rope plant at Muncy, Pa., which was completed about July 1, and is still installing equipment in a new research laboratory, containing among other equipment, the new "pilot" steel mill.

Beyond the normal rounding out of facilities and minor items, Bethlehem Steel Co. has no major construction projected. A $90,000,000 improvement and construction program was substantially completed earlier this year.

Inland Steel Co., which recently put in operation a new 44-inch mill at Indiana Harbor, and also has a new 1000-ton blast furnace, is going ahead with five new open hearths. This work probably will be completed by Jan. 1.

An $11,000,000 expansion and improvement program by American Rolling Mill Co., Middletown, O., has been carried forward through 1938. Crucible Steel Co. contemplates a $10,000,000 expansion program and preliminary work has been started. Much of the work, however, still is in the planning stage.

Financial Summaries

(*Concluded from Page* 14)

totaled $3,908,455, equal to $1.80 per share. In the same period last year net profit was $16,935,967.

INLAND STEEL

Inland Steel Co., Chicago, reports a net profit of $1,098,245 in the third quarter compared with $1,135,097 in the second quarter, and $4,433,375 in the third quarter last year. In the nine months this year net profit was $3,156,418, approximately 25 per cent of the $12,620,532 earned in the period last year. Directors declared the usual quarterly dividend of 50 cents on the capital stock, payable Dec. 1.

JONES & LAUGHLIN

Jones & Laughlin Steel Corp., Pittsburgh, reports third quarter net loss of $1,958,810, compared with a net profit of $1,750,696, or $1.25 a common share, in the third quarter last year. In the first nine months this year net loss was $4,882,838, against a net profit of $6,185,066, equal to $5.38 a common share, in the period last year.

M. A. HANNA CO.

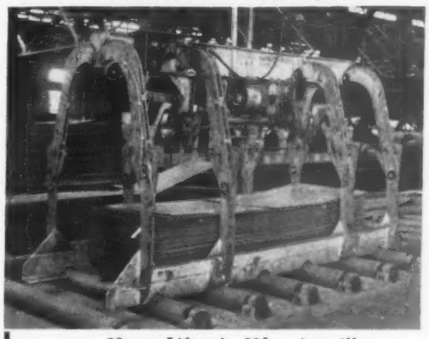
M. A. Hanna Co., Cleveland, reports consolidated net income for third quarter as $169,431, after interest on long term debt, federal taxes, depreciation and depletion. This is approximately equal to dividend requirements of $162,026 for the period on $5 cumulative preferred stock. Net income for nine months was $390,032, compared with $2,362,651 for the period in 1937.

Government's Steel Buying Totals $355,535

■ In the week ended Oct. 22, government departments entered into contracts for iron and steel and their products totaling $355,535. Included are: Noland Co. Inc., Washington, $13,422.00; National Tube Co., Pittsburgh, $76,534.20; Jackes-Evans Mfg. Co., St. Louis, $12,531.13; The Babcock & Wilcox Co., Beaver Falls, Pa., $12,224.05; Bethlehem Steel Co., San Francisco, $20,860.00; Concrete Steel Co., New York, $22,873.03; Hart Mfg.

SHEET STEEL HANDLING . . .

5 ton Lifter in storage dept.



20 ton Lifter in 80" strip mill.

C-F SHEET LIFTERS

SAFER
Tong action and automatic take up safely grip loads. End control protects operator.

BETTER
High grade stock handled without surface scratches or damage to edges.

CHEAPER
Handle packs of sheet steel instead of single sheets. Sheet storage room reduced.

FASTER
Jaw adjustment made in a few seconds. One man control.

Also made for handling tinplate, ingot molds, paper rolls, pipe, tubing, castings, tote boxes, flasks, skids, etc. Capacities 2 to 60 ton. Special designs to suit your requirements.

CULLEN-FRIESTEDT COMPANY
1308 S. Kilbourn Avenue Chicago, Illinois

Co., Louisville, Ky., $10,224.55; Detroit-Michigan Stove Co., Detroit, $27,200.00; Golden Gate Iron Works, San Francisco, $25,956.00; Bethlehem Fabricators Inc., New York, $29,354.27; Somaron Sheet Metal Works Inc., Bronx, N. Y., $25,300.00; Wickwire Spencer Steel Co., New York, $21,127.68; American Steel & Wire Co., Washington, $37,155.59; and Service Machine Co. Inc., Elizabeth, N. J., $20,752.50.

RFC LOANS TO INDUSTRY

Reconstruction Finance corporation continues to make loans to business and industry. Loans listed for September included: Illinois Malleable Iron Co., Chicago, $100,000; Globe Tool & Die Co., Rockford, Ill., $4000; Harvey Machinery Co., Harvey, N. D., $3500; and General Die & Tool Co., Cleveland, $3500. While all of these loans were authorized, no actual cash had been paid out by the RFC on the loans up to the end of September.

Canadian Steel Output Lower in September

■ Steel ingot and castings production in Canada during September was 73,556 gross tons, compared with 82,781 tons in August and 114,622 tons in September, 1937. Pig iron output in September was 49,972 tons, a slight increase over 49,477 tons made in August. It compares with 76,180 tons in September, 1937. Ferroalloy production was 3174 tons in September, 1857 tons in August and 7720 tons in September last year.

For nine months steel ingot and castings production was 911,005 tons, against 1,077,462 tons in the same period of 1937. Pig iron in nine months totaled 554,845 tons, compared with 654,438 tons in the corresponding months last year. Ferroalloys dropped from 55,636 tons to 42,319 tons for the same periods.

Foundry Expands

■ Utility Electric Steel Foundry, Los Angeles, will place in operation Nov. 1 an induction furnace for alloy steel castings. Six thousand square feet of floor space has been added to the main foundry building. Special foundry equipment has been installed to supplement the new furnace, which will make the alloy department a self-contained unit. The company is a wholly owned subsidiary of Utility Trailer Mfg. Co., maker of heavy duty trailers, semitrailers and attachments.

Nonferrous Metals

New York — Outstanding developments in nonferrous metals last week were the fluctuations of prices in London and announcements in this country of resumption of operations at several mining and smelting

STOP COSTLY CONFUSION!

A check-up may startlingly reveal you're "losing" plenty of metal because the identifying marks are illegible. Confusion results—and that means re-analysis, costly delays to shipments, valuable time squandered.

Prevent these losses with

PAINTCIL

Genuine quality paint formed into handy sticks and used like a pencil. Markings are permanently legible, do not run or drip on hot metal, defy weather and time.

TWO TYPES—one for marking hot metals up to 1500°F., the other for marking all cold surfaces, such as stone, wood, glass, metal, etc. Many attractive colors. Sold by leading jobbers.

Write for a FREE SAMPLE today

HELMER-STALEY, INC.

321 W. Huron St., Chicago, Ill.

Nonferrous Metal Prices

Spot unless otherwise specified. Cents per pound

Oct.	Copper: Electro, del. Conn.	Copper: Lake, del. Midwest	Copper: Casting, refinery	Straits Tin, New York: Spot	Straits Tin, New York: Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Amer. Spot, N.Y.	Nickel Cathodes
22	11.25	11.37½	10.77½	45.65	45.80	5.10	4.95	5.05	20.00	12.25	35.00
24	11.25	11.37½	10.77½	45.95	46.10	5.10	4.95	5.05	20.00	12.25	35.00
25	11.25	11.37½	10.77½	46.40	46.55	5.10	4.95	5.05	20.00	12.25	35.00
26	11.25	11.37½	10.77½	46.25	46.40	5.10	4.95	5.05	20.00	12.25	35.00
27	11.25	11.37½	10.77½	46.40	46.55	5.10	4.95	5.05	20.00	12.25	35.00
28	11.25	11.37½	10.77½	46.00	46.10	5.10	4.95	5.05	20.00	12.25	35.00

MILL PRODUCTS

F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 11.25c Conn. copper

Sheets

Yellow brass (high)	17.50
Copper, hot rolled	19.37½
Lead, cut to jobbers	8.25
Zinc, 100 lb. base	9.75

Tubes

High, yellow brass	20.25
Seamless copper	19.87½

Rods

High yellow brass	13.37½
Copper, hot rolled	15.87½

Anodes

Copper, untrimmed	16.62½

Wire

Yellow brass (high)	17.75

OLD METALS

Nom. Del. buying prices

No. 1 Composition Red Brass

New York	7.20-7.30
Cleveland	7.50-7.75
Chicago	7.00-7.25
St. Louis	7.00-7.25

Heavy Copper and Wire

New York, No. 1	8.75-9.00
Cleveland, No. 1	8.50-8.75
Chicago, No. 1	8.50-8.75
St. Louis	8.50-8.75

Composition Brass Borings

New York	6.30-6.55

Light Copper

New York	7.25-7.50
Cleveland	7.00-7.25
Chicago	6.75-7.00
St. Louis	7.00-7.25

Light Brass

Cleveland	4.50-4.75
Chicago	4.50-4.75
St. Louis	4.50-4.75

Lead

New York	4.00-4.25
Cleveland	4.00-4.25
Chicago	4.00-4.12½
St. Louis	4.00-4.25

Zinc

New York	2.50-2.62½
Cleveland	2.50-2.75
St. Louis	2.75-3.00

Aluminum

Borings, Cleveland	6.25-6.50
Mixed, cast, Cleveland	8.75-9.00
Clips, soft, Cleveland	13.25-13.50
Mixed cast, St. Louis	9.25-9.50

SECONDARY METALS

Brass ingot, 85-5-5-5, less carloads, 11.62½
Standard No. 12 aluminum....13.75-14.25

properties. The announcement on Friday that utility companies would place orders immediately for equipment to boost the country's generating capacity 1,000,000 kilowatts under the national defense power program was made in Washington.

Copper — Activity at copper and brass fabricating mills has increased to about 50 per cent of capacity and is expected to make further gains. Consumers are fairly well covered for immediate requirements and bought only moderate tonnages of electrolytic at 11.25c, Connecticut. Export copper fluctuated from 11.25c to 11.40c, c.i.f., during the week, closing at about the mean level.

Lead — Continued heavy buying for October delivery, despite previous heavy commitments for that month, tended to impart a strong undertone to the market. Prices held firm at 4.95c, East St. Louis.

Zinc — Production of galvanized sheets declined one point to about 65 per cent of capacity but galvanizers remain quite bullish. Fresh demand was light last week, but prices held at 5.05c, East St. Louis, for prime western.

Tin—Straits spot advanced rather steadily to new highs for the year, touching 46.40c on Tuesday and Thursday. Tin plate manufacturers were buyers although operations are calculated at only 20 to 30 per cent of capacity.

Iron Ore

Iron Ore Prices, Page 70

Chinese wolframite prices have not increased appreciably despite the stronger market resulting from Japanese war operations. Offerings are holding at around $21, duty paid. Most domestic consumers still have fair supplies and are out of the market. Domestic scheelite is nominally stronger at $17 to $17.50, duty paid equivalent.

Semifinished

Semifinished Prices, Page 67

Pittsburgh — Semifinished steel orders are heavier. Smaller mills are better buyers, while releases against old orders are larger. Billets and sheet bars show the most improvement. Skelp is steady but wire rod activity is leveling off.

Tin Plate

Tin Plate Prices, Page 66

Pittsburgh — Tin plate continues dull. Action has yet to be taken on prices for 1939 contracts, with various factors tending to postpone announcement of next year's market. A few orders have been placed, these being small and apparently to fill in depleted stocks. Inventories of both tin plate and finished cans are small. Production holds about 30 per cent for the tin plate industry as a whole.

Ferroalloys

Ferroalloy Prices, Page 68

New York—Ferromanganese shipments reflect improved ingot operations, October showing a gain for the fourth consecutive month. A further increase is seen for November. Prices on all major ferroalloys are unchanged, including tungsten products, which are inclined to fluctuate more freely than most grades.

Equipment

New York—Machine tool orders in October show another slight gain, making the fifth consecutive month domestic sales have risen. A more impressive upturn is shown by shops selling foreign accounts, some attractive orders having been placed the past two weeks. Domestic buying is mostly for replacement and usually calls for single units, demand for plant expansion being confined principally to the airplane industry. Navy yards are better buyers, including Washington where bids have been taken on a score of tools, including eight turret lathes on which Bardons & Oliver, Cleveland, is low at about $46,000.

Boston—Machine tool business of New England builders has been bolstered by another spurt in buying abroad. Domestic orders are slightly more numerous but are limited to a few tools at a time. Backlogs are well sustained on the average, deliveries on some units now being booked for foreign shipment being about three months. Government shops, principally the navy, are heavier buyers. For Portsmouth, N. H., bids are in on about 20 tools, including five boring, drilling and milling machines. A horizontal borer and miller is pending for the Boston yard.

Chicago—After a slight tapering off of bookings last week, machine tool demand is reported improved somewhat, although not sufficiently, some sources report, to prevent sales for the month being below the September level. In the meantime, inquiries are decidedly better.

BY THE BOX OR BY THE MILLION!

• Made by the Kaufman Process, our own patented method of manufacture developed in our own plant, Cleveland Cap Screws insure fast assemblies because they are so uniformly accurate and strong. A Class 3 fit is standard. Heads are a true wrench fit. Carefully pointed, nuts are quickly assembled. A stock of 30 million Cleveland Cap Screws is maintained at our four warehouses and the factory—ready for immediate shipment. Greatly increased plant capacity provides even better facilities for prompt handling of quantity production orders. Ask for Catalog E and current price list. THE CLEVELAND CAP SCREW CO., 2935 E. 79th St., Cleveland, Ohio.

Address the Factory or Our Nearest Warehouse:

CHICAGO, 726 W. Washington Blvd.
PHILADELPHIA . 12th & Olive Sts.
NEW YORK . . . . 47 Murray Street
LOS ANGELES . 1015 East 16th St.

CLEVELAND CAP SCREWS
SET SCREWS • BOLTS AND NUTS

Construction and Enterprise

Ohio

AMHERST, O. — Village, C. E. Cooper, mayor, has been allotted PWA grant and will issue bonds to finance construction of municipal light and power plant to cost $145,000; Floyd Browne, Marion, O., consulting engineer.

COVINGTON, O. — Village, George Hollopeter, mayor, is completing plans to take bids about Nov. 7, due about Nov. 21, on waterworks repairs costing $54,500. Voters approved bond issue and PWA has allotted grant on project. M. W. Tatlock, Dayton, O., consultant.

DAYTON, O. — Army air corps, materiel division, contracting officer, Wright field, takes bids to 10 a.m., Nov. 8, on 100 fuel pressure signal contact assemblies, 300 fuel pressure signal contacts and 150 fuel pressure signal studs. (Circular 39-292.).

GREENWICH, O.—Village, Charles Grum, mayor, has received PWA grant and authorized engineer, R. F. Macdowell, Cleveland, to start detailed plans for water-softening and iron removal plant costing $19,000. Plant to have 100-gallons per minute capacity.

HOLLOWAY, O.—Village, H. E. Van Fossen, mayor, is taking new bids due at noon, Nov. 7, on water treatment plant project costing approximately $14,000. Consulting engineer, Rank Frazier, St. Clairsville, O. Bond or certified check 1 per cent with bid.

HUBBARD, O.—Village, A. J. O'Brien, clerk, plans to construct water softening and filtration plant; has filed application for PWA grant, and will issue revenue bonds. Total cost of project estimated at $45,606. F. M. Brewer, city engineer.

MARBLEHEAD, O.—Village, Anthony Turinsky, mayor, votes Nov. 8 on bond issue of $36,500 to finance construction of water supply system, including filter plant and small service plant; await approval of PWA grant. Consulting engineer, Wilbert Henkelman, Sandusky, O.

MARTINS FERRY, O.—City, Walter Lipphardt, service director, contemplates making improvements in its waterworks at cost of $323,000, and improvements in its electric light plant at cost of $394,500; latter work to include building of new 3000-kilowatt unit. Consulting engineers, Burns & McDonnell, Kansas City, Mo.

MONROEVILLE, O.—Village, C. H. Zippel, mayor, will advertise for bids soon, to be due about Dec. 5 on construction of municipal light plant costing $78,180; will install three diesel engines and 5-ton crane. PWA grant approved. William C. Kammerer & Associates, Cleveland, consulting engineers. (Noted Sept. 26.)

NEWARK, O. — Licking Rural Electric Co-operative Inc., C. D. Dunlap, superintendent, has received REA allotment in the construction of 244 miles of rural transmission lines in three counties at cost of approximately $258,000.

NEW CARLISLE, O. — City, E. W. Williams, mayor, will be ready for bids soon on construction of $115,447 sewer system and sewage disposal plant. Burgess & Niple, Columbus, O., consulting engineers.

ST. MARYS, O. — Western Farm Bureau Electric Co-operative Inc. is taking bids due Nov. 15 for erection of 291 miles rural power transmitting lines in four counties. Dayton Morgan Engineering Co., Dayton, O., engineer. (REA project C.)

ST. MARYS, O. — Village, Mont Youngs, auditor, is accepting bids to noon, Nov. 7, on light plant additions totaling $90,000; project includes superheat turbogenerating unit with air cooler, surface condenser, steam piping and switchboard changes. Bond or certified check 10 per cent to accompany bid. Carl Lambert, Miami, Fla., engineer. (Noted Oct. 3.)

WEST LAFAYETTE, O. — Village, C. O. Wickens, clerk, plans to construct sewers and sewage disposal plant, and will submit to voters on Nov. 8 proposal to issue $30,000 bond issue.

Connecticut

DARIEN, CONN.—Town, water and sewerage commission, has been allotted PWA grant for construction of projected sewerage system, including sewage treatment plant, at cost of $562,250. Sanborn & Bogert, New York, engineers.

Massachusetts

SPRINGFIELD, MASS.—City, C. W. Phillips, superintendent, department of streets and engineering, takes bids to Nov. 8 for construction of two sewage disposal plants, total cost of which will exceed $3,000,000. George Gascoigne & Associates, New York, engineers.

New York

SOMMERVILLE, N. Y.—Staso Milling Co., manufacturer of surfacing minerals, has awarded contract for new plant costing an estimated $750,000 to Austin Co., 19 Rector street, New York.

WHITE PLAINS, N. Y.—Westchester county sanitary sewer commission is planning to construct trunk sewer, submarine outfall and sewage treatment plant to cost total of $980,000. Engineer, W. W. Young, care of owner.

WHITESBORO, N. Y.—Richardson & Boynton Co. is taking bids on plant additions costing in excess of $40,000. Eadie, Freund & Campbell, New York, engineers.

New Jersey

PATERSON, N. J.—Quackenbush Co. has awarded $110,000 contract for construction of a five-story, 85 x 115-foot warehouse and service building to E. M. Waldron Inc., Newark, N. J.

PATERSON, N. J.—Wright Aeronautical Corp. has let $200,000 contract to Mahoney Troast Construction Co., Passaic, N. J., for erection of a two-story, 70 x 260-foot testing building.

Pennsylvania

BUTLER, PA. — City is taking bids due 10 a.m., Nov. 10 on installation of two trickling filters and appurtenances costing $100,000 as part of a sewage treatment plant project. Chester Engineers, Pittsburgh, consulting engineers. (Noted Sept. 5.)

Michigan

BENTON HARBOR, MICH. — PWA has granted an allotment to the city in the construction of a complete sewage system which will cost about $340,000.

DAVISON, MICH. — PWA has allotted grant to village, Earl Hartman, clerk, to aid in construction of projected waterworks to cost about $75,000. Consulting engineer, Bruce Buchanan Inc., Pontiac, Mich.

DETROIT — Apex Metal Specialties Inc. has been incorporated by Aksel Kristenson, 13845 Elmira avenue, to deal in tools and related equipment. Capital is 150 shares no par value stock.

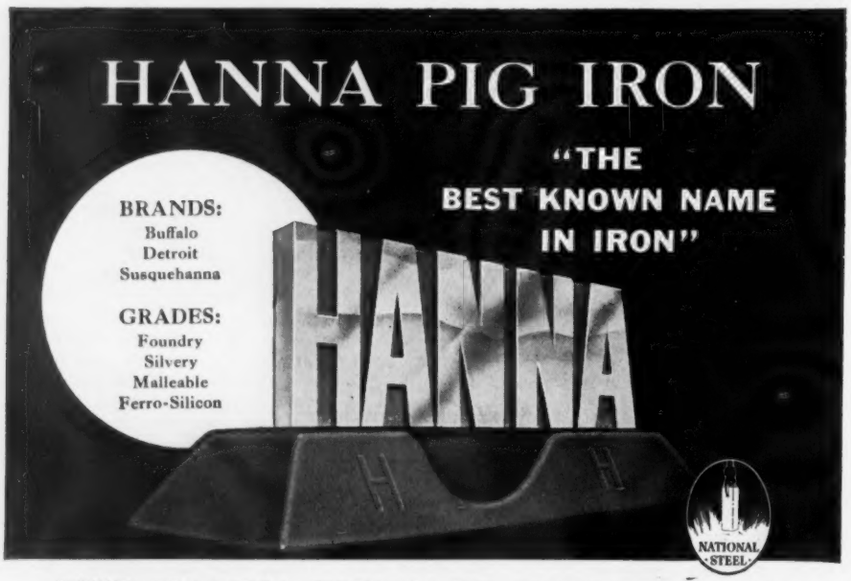
FLINT, MICH. — PWA has approved a $103,909 grant to city, J. R. Pollock, manager, in the proposed construction of a water supply system to cost $231,091.

Indiana

HAMMOND, IND.—City plans to construct large pumping station in connection with proposed extensions of its water and sewerage systems; whole project to cost $3,195,075 of which $1,437,784 is federal grant.

Alabama

JACKSONVILLE, ALA.—City, G. C. Currier, mayor, receives bids Nov. 4 for constructing complete waterworks



THE HANNA FURNACE CORPORATION
MERCHANT PIG IRON DIVISION OF NATIONAL STEEL CORPORATION
Buffalo Detroit New York Philadelphia Boston

system for which funds totaling $80,000 are available. Consulting engineers, J. W. Goodwin Engineering Co., Birmingham, Ala.

RED LEVEL, ALA.—City, C. M. Hall, clerk, opens bids about Nov. 15 for improvements to waterworks costing about $30,000; project to include pumping plant, hydrants, tank and distributing lines. R. L. Kenan, Montgomery, Ala., engineer. (Noted Oct. 17.)

SCOTTSBORO, ALA.—Skyline Mfg. Co. Inc. awarded contract for construction of 317 x 96-foot steel, brick and glass block plant at Skyline farms, at cost of $93,958, to A. K. Adams & Co., Atlanta, Ga. Will install air conditioning and sprinkler equipment.

Georgia

MOULTRIE, GA.—J. B. McCrary Co., 22 Marietta building, Atlanta, Ga., has general contract at $97,899 for constructing sewer system, disposal plant and pumping station for the city. Wiedeman & Singleton, Atlanta, Ga., engineers.

THOMASTON, GA.—Upson County Electric Membership Corp. has been allotted $129,000 by REA for building 121 miles rural transmitting lines through two counties.

Mississippi

HICKORY, MISS.—Town, L. M. McMullan, mayor, receives bids Nov. 4 for contract B, general contract for waterworks system consisting of 75,000-gallon steel tank, pump house, solution feeder, booster pump and pipes; $22,000 available. John M. Gilfillan & Associates, Jackson, Miss., engineers.

KOSCIUSKO, MISS.—City has plans under way to construct an extension and make other improvements in its water and light plant; voters approved $65,000 bond issue.

WEST POINT, MISS.—PWA has allotted $28,000 to city on project to construct sewerage interceptor and treatment plant on which city, H. L. Murphy, clerk, receives bids Nov. 7. Architects, Feemster & Striger, Tupelo, Miss.

North Carolina

HICKORY, N. C.—A. H. Guion & Co., Kinney building, Charlotte, N. C., has $242,310 contract for constructing sewage disposal plant.

LENOIR, N. C.—Caldwell Mutual Corp. has received REA allotment of $377,000 for constructing 276 miles rural power transmission line in three counties.

MORGANTON, N. C.—Town, B. Bristol Sr., mayor, receives bids Nov. 1 for waterworks and sewerage improvements estimated to cost $265,000 and including mains, sewer lines and chlorinating equipment. Chester F. Lewis, town engineer.

WAYNESVILLE, N. C.—Town, J. H. Way, mayor, receives bids Nov. 1 in sewerage construction for which $204,088 is available. Harwood Beebe Co., Spartanburg, S. C., engineer.

Tennessee

CROSSVILLE, TENN.—City, T. M. Rector, mayor, is planning to construct a filter plant and lay pipe lines; cost about $85,000.

ETOWAH, TENN.—PWA has approved a grant and loan to city to enable construction of a municipal electric distribution system costing $169,000; will use TVA power. (Noted July 4.)

PULASKI, TENN.—TVA has approved construction of 54 miles of power lines in Pisgah, Stella and Aymett communities, at cost of $52,717.

Louisiana

LAKE CHARLES, LA.—City plans to construct central heating plant for two municipal buildings at total cost of approximately $900,000.

Virginia

PEARLSBURG, VA.—American Cellulose & Chemical Mfg. Co., 189 Madison avenue, New York, plans to begin work about March 1 on a plant to cost $10,000,000.

VIENNA, VA.—Town council is planning to construct sanitary sewers and waterworks estimated to cost $102,896; has applied to PWA for grant of $88,878. F. A. Wilcox, town clerk.

Missouri

ROLLA, MO. — City, W. D. Jones, mayor, receives bids Nov. 13 for constructing sewage disposal plant; $51,000 available. Engineers, Russell & Axon, St. Louis. (Noted Sept. 5.)

ST. LOUIS—Johnston Tin Foil & Metal Co. will soon award contract for constructing a one-story, 100 x 100-foot addition to its factory. O'Meara & Hills, 5709 Waterman avenue, St. Louis, architects.

ST. LOUIS—City, B. F. Dickman, mayor, is drawing detailed plans for $578,000 improvements at Chain of Rocks water plant, and has applied to PWA for $260,100 grant; also plans improvements at Howard Bend plant costing $300,000.

Arkansas

CROSSETT, ARK. — Crossett Paper Mills has begun work costing approximately $750,000 on plant additions and improvements; plans call for four new units, including extension to finishing and storage rooms, power plant with turbine generator, bleaching plant and by-product recovery mill. Construction by Rust Engineering Co., Pittsburgh, is to be completed by March.

FAYETTEVILLE, ARK.—Ozark Rural Electric Co-operative Corp. has been awarded $244,000 REA allotment for constructing 260 miles of power transmission lines in three counties.

Oklahoma

NASH, OKLA.—Champlin Refining Co., Medford, Okla., plans a $35,000 water project to supply water for company's drilling operations.

Wisconsin

MILWAUKEE — Kearney & Trecker Corp. has let contracts for 25 x 70-foot addition to the boiler room and pipe shop at its 6771 West National avenue milling machine plant.

Minnesota

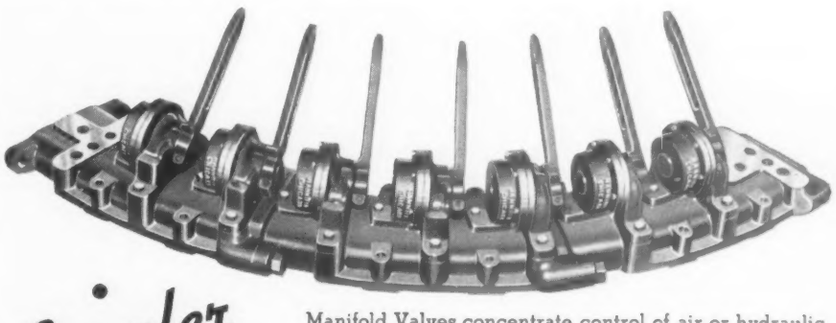
MABEL, MINN.—PWA approved grant to the city for construction of sewage disposal plant to consist of pump house, trickling filter, Imhoff tank, clarifier, sand filter and sludge beds, costing about $26,000. Herman Hagestad, River Falls, Wis., engineer.

MADISON, MINN.—City, J. H. Hayden, clerk, has been granted PWA allotment for proposed construction of a water softening plant, pump house and chlorinating equipment costing $54,852. (Noted Aug. 15.)

TRACY, MINN.—PWA has allotted a grant to the city, H. M. Algyer, recorder, for $27,000 alterations of its sewage treatment plant; work includes additional Imhoff tank, trickling filter, settling tank and sludge beds. P. C. Bettenburg, St. Paul, engineer.

Texas

BRYAN, TEX. — City, R. G. Williams, manager, plans to construct a waterworks system costing $422,409 and has



Simpler Piping

Manifold Valves concentrate control of air or hydraulic cylinders and greatly simplify piping. Hannifin disc-type air control valves are available in many types for control of any kind of air equipment. These valves have no packing, and no leakage or packing maintenance troubles.

Also 3-way and 4-way hand and foot operated, spring return, electric and other types. Write for Valve Bulletin 34-S.

HANNIFIN MANUFACTURING COMPANY
621-631 South Kolmar Avenue • Chicago, Illinois

ENGINEERS • DESIGNERS • MANUFACTURERS • PNEUMATIC AND HYDRAULIC PRODUCTION TOOL EQUIPMENT

HANNIFIN "Packless" AIR CONTROL VALVES

filed application with PWA for $188,000 grant. Project includes construction of two reservoirs and drilling of two wells, etc.

EDNA, TEX.—City plans to erect and equip municipal light and power plant; voters approved proposal and passed on issue of $100,000 in revenue bonds to finance work.

HALLSVILLE, TEX. — City, A. L. Hendrick, mayor, receives bids Nov. 9 for construction of waterworks system for which funds available total $32,000. Joe Rady, Fort Worth, Tex., consulting engineer in work.

HOUSTON, TEX. — Piggly-Wiggly Corp., subsidiary of Kroger Grocery & Baking Co., has acquired two-story building at 2015 Congress street in which it plans to install food manufacturing machinery at cost of about $40,000.

HOUSTON, TEX. — Continental Supply Co. has let contract to George O'Rourke Construction Co., 2019½ Jackson street, for construction of $250,000 plant on 11-acre tract. Harry E. Weaver, Esperson building, architect.

JASPER, TEX. — City, M. P. Hancock, mayor, has voted approval of $170,000 bond issue and applied to PWA for a grant and loan in the construction of municipal power plant. Garrett Engineering Co., Houston, Tex., consulting engineer. (Noted Oct. 3.)

MERCEDES, TEX.—Magic Electric co-operative has been granted $236,000 REA allotment to assist in its 800-mile rural electrification project in three counties. J. E. Wilder, resident engineer.

PELLY, TEX.—City has plans underway for construction of municipal electric distribution system and transmitting lines to cost total of about $170,000; federal financing being arranged. Garrett Engineering Co., Houston, Tex., consulting engineer.

WICHITA FALLS, TEX. — City, Bryan Miller, manager, makes plans for construction of waterworks system for which voters approved issue of $400,000 bonds; seek PWA assistance in project. (Noted Aug. 22.)

Kansas

CHANUTE, KANS.—City plans to install boiler and make other improvements in its light plant at cost of $93,238, and has filed application with PWA for a grant. R. B. Reeves, city engineer.

CONWAY SPRINGS, KANS. — City, Homer Hunt, mayor, has been allotted PWA grant for construction of sanitary sewers and sewage disposal plant costing $48,700. Black & Veatch, Kansas City, Mo., consulting engineers.

FREDONIA, KANS.—PWA approved allotment to city, O. C. Wilson, clerk, for construction of sewer extensions, pumping plant and sewage disposal works to cost total of $86,000. Paulette & Wilson, Salina, Kans., consulting engineers.

OSWEGO, KANS.—City, W. A. Blair, mayor, has filed application with PWA for a grant for projected construction of a generating station to cost $98,815. Albert C. Moore, Weatherford, Tex., is consulting engineer.

PITTSBURGH, KANS.—PWA has approved grant to the city, George Dalton, correspondent, for enlargement of the sewage disposal plant and garbage disposal plant at cost of $190,000. Black & Veatch, Kansas City, Mo., consultants. (Noted Sept. 26.)

WHITEWATER, KANS. — City, Paul Ross, clerk, is planning to construct a waterworks plant costing $110,000 and has filed application for a PWA grant. E. T. Archer & Co., Kansas City, Mo., is consulting engineer.

South Dakota

BRYANT, S. DAK.—PWA approved allotment to the city, Henry Gilbertson, auditor, for alteration and improvement of its municipal electric system by changing from direct to alternating current and installing new 100-kilowatt diesel unit. Cost is $49,600.

Nebraska

ARNOLD, NEBR. — PWA approved grant to the village, E. L. Scott, clerk, for projected construction of a sanitary sewer system and sewage disposal plant costing $44,900. A. J. Van Antwerp, Broken Bow, Nebr., consulting engineer.

FAIRFIELD, NEBR.—City, Fred Glass, mayor, plans to construct an electric distribution system costing $44,700 and has filed application with PWA for a grant and loan to finance project. Plans prepared by Central Nebraska public power and irrigation district, Hastings, Nebr.

HARTINGTON, NEBR.—City, L. R. Eby, mayor, is seeking PWA assistance in the projected construction of a municipal electric plant to cost $114,500. H. H. Henningsen Engineering Co., Omaha, consulting engineer.

MINDEN, NEBR.—PWA approved grant to city, Fred Martin, clerk, for construction of additions and alterations to its sewage treatment plant costing $40,540. Black & Veatch, Kansas City, Mo., engineers.

NORTH PLATTE, NEBR.—City, George Dent Jr., mayor, is planning construction of a municipal electric system costing $721,445, and has applied for PWA grant. Consultant is Robert Fulton, Lincoln, Nebr.

OMAHA, NEBR.—City, Harry Trustin, city engineer, proposes to construct a sewage disposal plant costing $704,052 and has filed application with PWA for grant. George Gascoigne & Associates, Cleveland, consulting engineers.

TECUMSEH, NEBR.—City, J. V. Johnson, mayor, has filed application with PWA seeking grant for proposed improvement of its light and power plant at cost of $86,500. H. H. Henningsen Engineering Co., Omaha, Nebr., consulting engineer.

Iowa

ANAMOSA, IOWA—REA has allotted $299,000 grant to Maquoketa Valley Rural Electric co-operative, Edgar Beach, superintendent, to finance construction of 275 miles rural transmission lines in five counties.

HAWARDEN, IOWA—Sioux Electric co-operative, George Boerhave, president, has been allotted REA funds for construction of 239 miles rural power transmission lines costing about $250,000.

MANLY, IOWA—PWA approved grant to the city to aid in construction of a sewage system, including disposal plant, to cost total of $75,814. Consulting engineer on project is Currie Engineering Co., Webster City, Iowa.

OSAGE, IOWA—Co-operative Electric Co., Albert Olson, president, has received $222,000 REA allotment for construction of 211 miles rural power lines through four counties.

PRIMGHAR, IOWA—REA has allotted $307,000 to O'Brien County Rural Electric co-operative, E. M. Dodge, president, to finance construction of 276 miles of lines in O'Brien and three other Iowa counties.

Colorado

CARBONDALE, COLO. — City has plans in progress for the construction of a municipal hydroelectric plant and electric distribution system at cost of about $42,000. Federal financing is being arranged.

GRAND JUNCTION, COLO.—City takes bids to Nov. 16 for constructing sewerage system and sewage disposal plant to cost $185,000; PWA project. Black & Veatch, Kansas City, Mo., are consulting engineers on project.

Wyoming

SUNDANCE, WYO.—PWA has approved allotment of funds to city, C. D. Roberts, mayor, for construction of light and power plant and extension of electric distributing system at cost of $47,000.

Montana

LEWISTOWN, MONT.—City, George Waltz, clerk, has approved issuance of bonds to supplement PWA grant in financing construction of proposed sewage disposal plant to cost $108,000. Bids probably to be taken in December. J. M. Schmidt, city engineer.

Pacific Coast

GLENDALE, CALIF.—City, board of education, is planning to build central heating plant in junior high school group which will cost close to $600,000. Erwood Eiden, Glendale, architect.

LOS ANGELES—Liquid Metals Corp. of America has been incorporated with 2500 shares of stock, no value stated. Representative is Jay Stein, William Fox building, Los Angeles.

LOS ANGELES—Acme Metal Die & Stencil Works has been formed with capital of $25,000. Directors are: T. M. Morris, Joseph Graham, Anna Levins, Lester La Fortune and Thomas Mercola.

LOS ANGELES—Unitrac Mfg. Co. has been incorporated with capital stock of $154,500 by directors K. D. Buchanan, Frances Aldrek, F. A. White, H. W. Funke and R. E. Mon. Representative is H. W. Funke, Jergins building, Long Beach, Calif.

LOS ANGELES—Burns-Pilgrim Tool Co. has been incorporated with capitilization of $25,000 by directors Erwin Burns and Frank Guntey of Los Angeles, and Ford Pilgrim of Santa Monica, Calif. Representative, Oscar Sattinger, 810 Flower street, Los Angeles.

SAN CLEMENTE ISLAND, CALIF.—Navy department, yards and docks, Washington, D. C., has awarded $287,567 contract for installing aviation facilities and appurtenant equipment in eleventh naval district to F. D. Greenfield Co., Los Angeles.

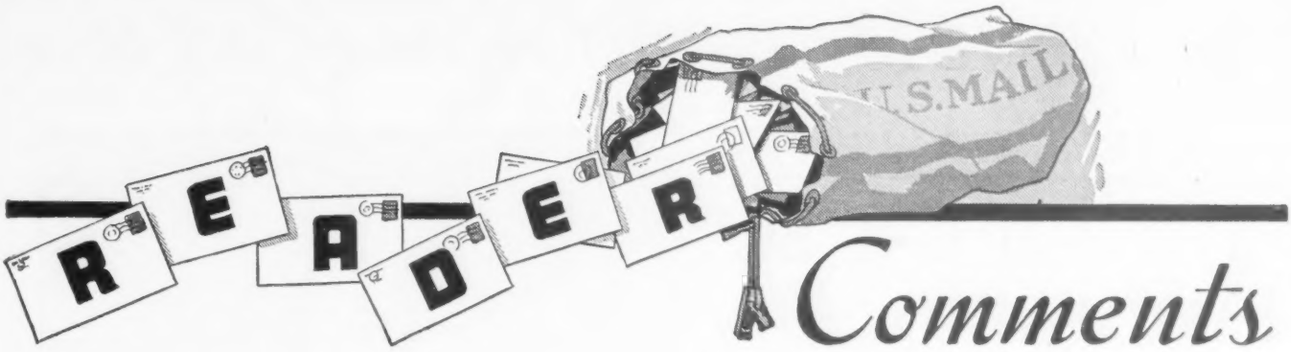
VANCOUVER, WASH.—Pacific Molybdenum Corp. has been organized with $30,000 capital by a group headed by Byron Reed, Clark County National Bank building, Vancouver.

ANCHORAGE, ALASKA—Voters have approved proposal to construct gravity water system and make other improvements and passed bond issue of $110,000 to finance the work. Pipe lines and other equipment will be installed.

Canada

GOLDFIELDS, ALTA. — Consolidated Mining & Smelting Co. Ltd., W. G. Jewith, general superintendent, is making plans to construct a power plant which will cost about $700,000. Company engineer, S. Gray.

QUEBEC, QUE.—Province of Quebec, O. Gagnon, minister, department of mines, is having plans prepared for construction of a zinc refining plant estimated to cost $900,000.



Comments

Readers are invited to comment upon articles, editorials, reports, prices or other editorial material appearing in STEEL. The editors cannot publish unsigned communications, but at their discretion may permit a writer to use a pseudonym when a bona fide reason exists for withholding his identity. Letters should be brief—preferably not exceeding 250 words.

Trade Conventions Valuable

To the Editor:

We cannot speak for other industries, but for machine tool builders our two annual meetings are of great importance.

Our industry has a responsibility toward our country that is far greater than its size would indicate. We need constantly to study the problems that are common to all machine tool builders; to find ways of improving the service we render and the machines we build; to improve our designs, lower our manufacturing costs, and improve our sales methods.

It is only by means of better machine tools that this country can improve its standard of living and afford "more goods for more people." We need to understand fully the effect of new national policies in our industry and to keep in touch with a shifting world outlook, and our conventions afford the opportunity we need to discuss these matters with the care and attention they deserve.

W. E. WHIPP

President,
Monarch Machine Tool Co.,
Sidney, O.

No Program; Just Living It

To the Editor:

If our company is a criterion there must be a lot of correspondence between manufacturers on the subject of public relations. We are attaching a copy of our advertising manager's reply to one of these letters. The executive vice president thought it so aptly described our public relations policy that he sent a copy to every official of the company. We believe your readers may be interested in the following excerpts:

Although our company may have attracted some attention for the character of its public relations, that situation can hardly be said to be the result of a public relations program.

I suppose it might be possible to chart the things we have done and are doing of a public relations nature, in the form of a program, but we have never done so and I rather shudder at the thought of undertaking the task, not because of its difficulty, but because I feel it would tend to formalize what now comes from the heart rather than just from the lips . . . . I like to believe that our entire organization is public relations minded, and I think that the most that can be done by any individual who is charged with public relations responsibilities is to keep the entire organization public relations conscious.

Public relations, I believe it is generally agreed, are of a threefold nature, concerned with employes, customers and the general public, or perhaps the latter classification might be broken down to form two classes, the community in which the business is located and the public outside that community. As far as employe relations are concerned, they are handled by a competent industrial relations department.

In relations with our customers and prospective customers we all try to be constantly mindful of our opportunities through our business correspondence, advertising literature and other contacts of every kind, of creating a favorable impression of our company and our products and of constantly strengthening that impression.

In our local community the same thing is true, as a result of which I believe our company is well thought of among the people of Peoria and surrounding towns. To mention specifically some of such activities, I might say that our executives, in addition to activities in trade organizations, professional societies and fraternal bodies, have responded to calls for community service, not by seeking such duties but by giving liberally of their own time and by being encouraged by the management to give a reasonable amount of company time to such responsibilities . . . .

Our relations with local newspapers are rather unique. As many as seven or eight years ago our president accepted the recommendation of adopting an open-door for the newspaper boys and of neither trying to put anything over with them nor of withholding anything from them. The results of this policy have been gratifying and though at times items have not been entirely to our liking the total on the other side shows a handsome profit balance.

BURT POWELL

News Editor,
Caterpillar Tractor Co.,
Peoria, Ill.

Why Government Age Limit?

To the Editor:

I am taking the liberty of writing to say how greatly I appreciate your Reader Comments page, where we can discuss vital matters.

I would like to have someone explain why the government will not allow anyone to take a civil service examination, for any kind of a job, who is over 45 years of age. Yet it expects and insists that all other employers take on people at that age. I have always thought that what was bad for the goose was bad for the gander. Better clean up the silverware at home first.

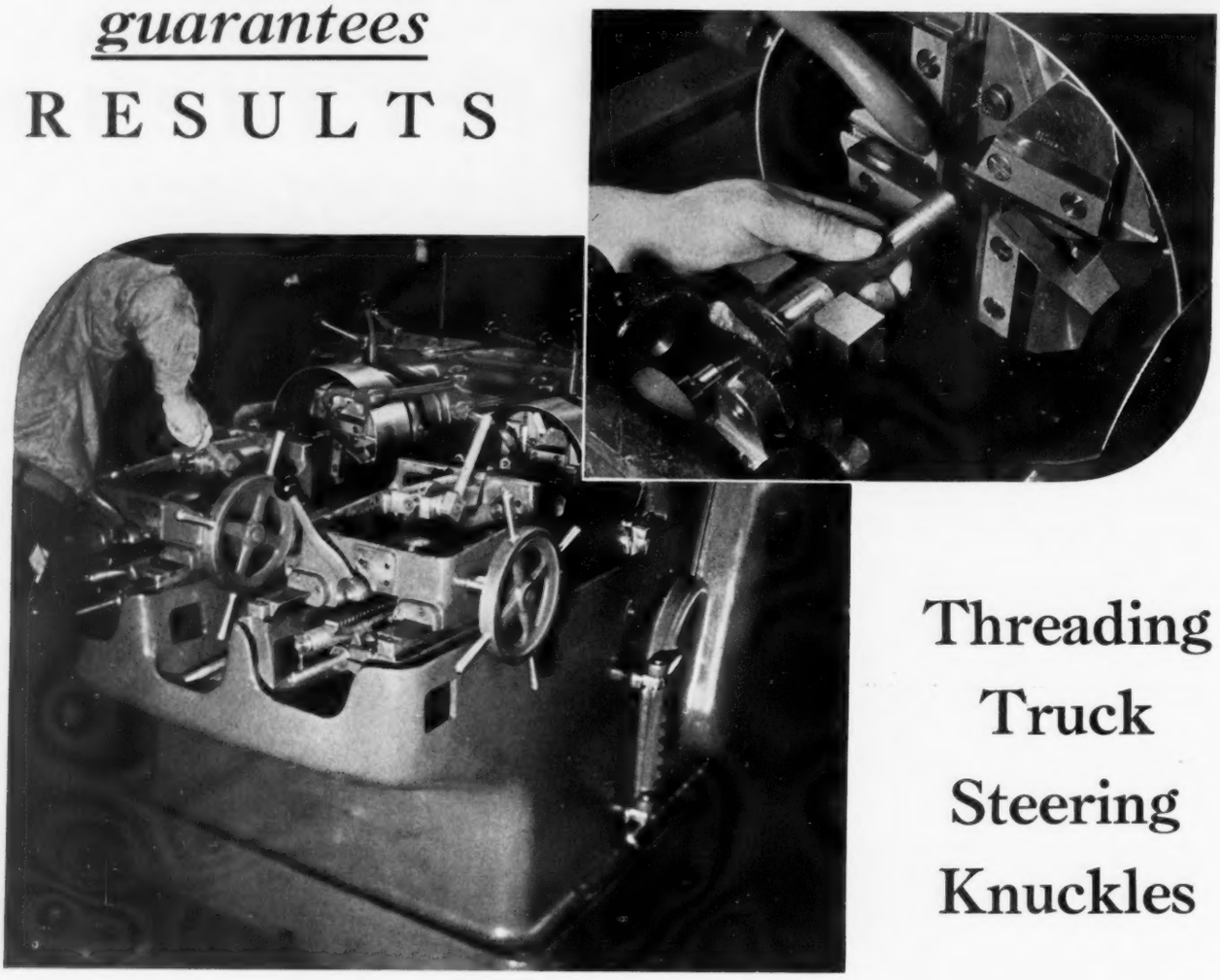
Sometimes I think it matters little what we older fellows think and say today, but nevertheless, the rise or fall of our nation in the years to come depends entirely on the people who have the power to control conditions today and I believe the gerat Giver, who has given these people the power and the responsibility, will hold them strictly accountable for whatever failure they make.

REGISTERED PROFESSIONAL ENGINEER
Johnstown, Pa.

The LANDMACO Threading Machine

guarantees

RESULTS



Threading Truck Steering Knuckles

This job is being handled at low cost in a well known automotive plant on a LANDMACO Threading Machine—a thoroughly modern machine tool with many features which insure the accuracy, economy, ease of operation, and high productivity which characterize this highly developed class of Production.

This threading job is important because it involves the production of threads which must be exactly right in order to insure the permanent holding of a vital part in a truck steering mechanism.

With the LANDMACO Threading Machine, threads are held to the closest limits, with exactly the class of fit called for by the specifications, to insure maximum strength and holding power for greatest safety.

We will be glad to send complete information on the LANDMACO Threading Machine. Write us today.

LANDIS MACHINE COMPANY, Inc.

Waynesboro, Penna.